

THE SPIDER GENUS *ARIADNA* IN THE AMERICAS (ARANEAE, DYSDERIDAE)

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INTRODUCTION

The spider family Dysderidae, to which the genus *Ariadna* belongs, is one of a series of presumably primitive families called the haplogyne spiders, from the simplicity of their genitalia. Other haplogyne families are the Plectreuridae, Diguettidae, Sicariidae, Scytodidae, Caponiidae and Oonopidae. (The families Leptonetidae, Ochyroceratidae, and Telemidae, often included in the haplogyne series, are possibly more closely allied to the Araneoidea, and are omitted from consideration here.)

Dysderids are medium- to large-sized spiders (maximum body length about 25 mm) of either sedentary or wandering habits. Their web is of the tubular retreat type, sometimes with radiating trip lines extending from the mouth, but containing no viscid silk, and not functioning as a snare. The spiders have six eyes (or no eyes, as in a few cave-dwelling species), two lungs, and a pair of tracheal spiracles close behind the lung apertures; they bear usually three, sometimes two, tarsal claws. The family is nearly cosmopolitan in distribution, but is absent or rare in polar and cold northern temperate regions.

The genus *Ariadna* is of interest because of its almost worldwide distribution, its occurrence on isolated islands, the many species that have been described, and the fact that it is haplogyne. The genitalic

simplicity of haplogyne spiders makes identification of specimens, especially females, difficult. As a consequence, the taxonomy of the haplogyne families has been in a confused state until recently.

A revision of the American *Ariadna* was the principal objective of this study, in which, as far as possible, the males were distinguished by genitalia. A secondary objective, however, was a search for other taxonomic characters. Computer methods were used in this search and in the grouping of species, and the calculated results were compared with those obtained by a "classical" taxonomic approach (Beatty and Bossert, in prep.). Although the secondary objective is probably of more general interest and application, all phases of the study are, of course, closely interrelated.

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POSITION OF THE DYSDERIDAE AMONG THE HAPLOGYNE FAMILIES

The haplogyne spiders are readily separable into two groups that may deserve to be ranked as superfamilies. These groups are distinguished primarily by differences in chelicerae, posterior respiratory organs, and number of heart ostia.

In the Plectreuridae, Diguettidae, Sicariidae, and Scytodidae, the chelicerae are chelate and are joined to each other basally over one-fourth or more their length; a single median tracheal spiracle is situated behind the middle of the abdomen but not immediately adjacent to the spinnerets, and the heart has three pairs of ostia. Within this group, the Plectreuridae and Diguettidae are similar to each other in some characters, but differ strongly from the Sicariidae and Scytodidae. The latter families are close to each other morphologically.

In the Dysderidae, Oonopidae, and Caponiidae, the subchelate chelicerae are free from each other or are only barely connected by membrane proximal to the sclerotized part of the appendages; a pair of large tracheal spiracles is situated just behind the lung openings, and the heart has two pairs of ostia. Additional data are summarized in Table 25.

In the collection of the Museum of Comparative Zoology, I have examined a few unidentified specimens that do not appear to fit well into any of the recognized families. Many new species and some new genera almost certainly remain to be discovered, especially in south temperate regions. The intermediate structural characters of some of these species will probably discourage maintenance of seven separate families for the haplogyne spiders.

Within the haplogyne series, the Dysderidae are distinguishable from the sicarioid families by the characters listed above. They differ from the other two families as follows: from all the Caponiidae and a few of the Oonopidae by their having six eyes; from most of the six-eyed oonopids by the arrangement of the eyes; from both the Caponiidae and Oonopidae by their well-developed book lungs, the presence of a tarsal claw on the palp of the female, their larger size and sedentary habits, and their use of silk for making tubular retreat webs.

In habitus the larger dysderids seem primitive and similar to the plectreurids, filistatids, ctenizids, and liphistiids. Each of these other families is probably the most primitive living member of its particular suprafamilial group. The body size, leg proportions, color, sedentary retreat-web building habit, and genitalic simplicity of these five families, although far from providing conclusive evidence, certainly suggest relationship. I believe that a more intensive study of this group of families than has thus far been published would yield important data pertaining to the phylogeny of the Araneae.

NATURAL HISTORY OF ARIADNA

Members of the genus *Ariadna* are sedentary nocturnal spiders. Their tubular webs of closely woven pure white silk are slightly widened at the mouth, from which single threads radiate in all directions. These threads are attached to the substratum at distances of about two to ten millimeters from the tube. The spiders stand at the mouth of the tube at night or during periods of low light intensity during the day. They are highly sensitive to vibration of the radiating threads by potential prey, reacting with a rapid dash from the tube and back again. The movement is too swift to be followed precisely with the naked eye, but it appears that the spiders do not emerge completely from the tube. The prey is seized in the two

anterior pairs of legs. The double rows of heavy spines on the ventral surfaces of the legs probably function in preventing the escape of the prey.

All species of *Ariadna* for which information is available place their webs in the same type of microhabitat: crevices and small holes. Depending upon the size of the spider, the diameter of the web ranges from one to about ten millimeters. The web is generally built in a crevice that has a width about equal to the diameter of the tube. On one occasion, however, I saw a web suspended vertically in the center of a pipe that had a diameter of about two inches. Levi (pers. comm.) reports that juvenile *A. maxima* in Chile often build their webs on top of each other, so that a series of tube webs spans a wide crevice. The spider is so abundant that this behavior may result from a shortage of crevices of a more appropriate size.

In my experience, broken outcrops of rock are the sites most favored by *Ariadna*, but not all kinds of rock are equally acceptable. Unstable rocks such as shale are avoided; massive thick-bedded rocks usually do not have enough crevices of sufficient depth to support more than a scattered individual or two. One of the largest colonies I have seen was on Gibraltar Island in western Lake Erie. At one end of the island a weathered, highly fractured dolomite cliff rises 15–20 feet (5–7 m) from the edge of the water. The accessible portion of this outcrop, about 50 feet (17 m) long, is occupied by hundreds of *A. bicolor* webs.

The amount of moisture present is also of considerable importance. I have never found *Ariadna* on a rock outcrop from which even a small amount of water was seeping, nor in highly insolated outcrops in the lowlands of the southwestern and Mexican deserts. At low elevations of 2700 to 4600 feet (820–1400 m) in southern Arizona, *A. pilifera* occurs sparingly in rocks along canyon bottoms. At higher elevations it gradually spreads to more

exposed outcrops. In the Santa Catalina Mountains north of Tucson, Arizona, I have taken it at a maximum elevation of 7500 feet (2280 m).

Ariadna is also commonly collected in crevices on buildings and other man-made structures. I have collected *A. bicolor* in such places in Ohio, North Carolina, Florida, and Illinois, and *A. pilifera* in Arizona. Crevices in or under tree bark and palm fronds are frequently used, although less often than the above microhabitats. *Ariadna fidicina* has been taken from beneath eucalyptus bark in California, and *A. arthuri* from under the bark of red mangrove in the Florida Keys.

Additional microhabitats include crevices and small holes found within and about clumps of moss, beneath rocks or boards on the ground, among roots and stems of grass clumps (Barnes, 1953), in ground litter, and once in shipworm burrows in a hatch-cover thrown up on a Florida beach. All of these sites are used much less frequently than the three mentioned above, and the population densities are relatively low.

Even where some member of the genus is abundant, suitable microhabitats are often so localized that the spider appears rare. In such cases it is usually found only in the more marginal kinds of microhabitats. A special search and special collecting methods are usually required to determine its actual frequency in a given area.

A rock outcrop fitting the description given earlier will usually harbor at least a few *Ariadna*, and populations as high as five to ten per linear foot of crevice are not unusual. When the webs have been located, one can usually catch a large number of specimens in a short time by using the technique described below.

The only equipment needed is an ordinary dissecting needle and a vial, or a series of vials with cotton plugs if the spiders are to be kept alive for a time. While holding the open mouth of a vial near, but not touching, the mouth of the web, thrust

the needle quickly into the crevice at an oblique angle to the web, and as far back from the mouth of the web as possible. The object is to close off the web behind the spider, so that it can not escape from the rear of the web into the crevice. Place the mouth of the vial against the web opening, and gently work the needle forward. The spider will be driven forward and will usually make a quick dash from the web into the vial. If the collecting is done at night with the aid of a head-lamp, the spiders will be found sitting at the mouths of the web. Under these conditions they may be captured easily and quickly by the above method.

Two factors probably account for the colonial habit of *Ariadna*. The first is the relative scarcity and isolation of optimum microhabitats. The spiders are certainly present in many sub-optimum habitats, but in small numbers and thinly scattered. Second, no species of *Ariadna*, in fact no haplogyne spider of any kind, is known to balloon. The eggs of *Ariadna* are laid in the tube of the female and the young remain in the tube for some time after hatching. Judging from the size of known second-instar young and the smallest individuals found inhabiting their own tubes, I would guess that the juveniles leave the female's web between their second and third molts. Dispersal appears to vary from no more than a few millimeters to perhaps ten yards (10 m).

The food habits of *Ariadna* are virtually unknown. In captivity I have fed them leafhoppers, small moths, and *Drosophila*, all of which they took readily. The insects available in largest numbers to the Gibraltar Island colony are caddis-flies, midges, and Mayflies, which emerge from the lake in thousands during the summer. *Ariadna* is probably like many spiders in eating other spiders readily, also.

Courtship and mating in this genus have not been observed. Presumably it is similar to that of the related genera *Segestria* and *Dysdera*. Gerhardt (1921) described and

illustrated the mating behavior of *Segestria*. Males of this genus lack the spurs present on the anterior legs of some male *Ariadna*. The male pushes back the female's legs with his, moves under the female's carapace, and, holding the anterior part of her abdomen with his fangs, inserts both palps simultaneously into the genital groove. Mating behavior in *Dysdera* and in the mygalomorph spiders follows the same pattern.

The eggs of *Ariadna* are laid in the posterior portion of the tube, without being enclosed in an egg sac. The eggs are not sticky and the female, when disturbed, may move through the egg mass with little difficulty. The very few threads which tie the eggs loosely together may, therefore, be the result of the movements of the female over a considerable period following the laying of the eggs.

Egg masses and young spiders are rarely found with adult females in collections. The difficulty of extracting the entire web intact probably insures loss of some eggs and young even when attempts are made to collect them. Two collections of *A. bicolor* from the Emerton collection in the Museum of Comparative Zoology contain the following notes: "in closed bag with cocoon of about 25 eggs" (one female in this vial), and "with young in tube" (this vial contains two females and twelve young).

Two females of the same species that I collected on Gibraltar Island produced eggs in captivity. Females and offspring were preserved shortly after the eggs began to hatch. With one female were 26 eggs and hatchlings. There were a few more empty chorions than hatchling spiders; apparently a few young were lost even with careful removal from the web. The second female produced 71 eggs, a little more than half of which had hatched at the time of preservation. The remaining eggs, except one, contained well-developed embryos which probably would have emerged. Fresh egg masses, collected with three

different females on Gibraltar Island contained respectively 46, 69, and 95 eggs. It is believed that no eggs were lost from these masses during collecting.

Ariadna seemingly has an extended breeding season. There is a distinct tendency for males to be most abundant in late summer, but in Ohio and Pennsylvania, male *A. bicolor* may be collected from late May through September. The relative infrequency of males in most collections suggests that they tend to mature mostly during a short period of time, and may live only a short time after mating. Mature females evidently live more than one season. They may be collected, along with juveniles of all sizes, at almost any time of year. Winter, when the spiders retreat deep into their webs, is a possible exception, but lack of collecting at this season prevents a definite statement.

The chromosomes of one species of *Ariadna*, *A. lateralis* of Japan, have been reported by Suzuki (1952). The diploid number is eight, the smallest known for any species of spider. Sex determination is XO, the male being the heterogametic sex. In view of the tendency to regard high chromosome number as primitive and low numbers as derivative within a given taxon, the chromosome number of *Ariadna* is especially interesting. One species of the Liphistiidae has a $2N$ chromosome number of 94 or 96. Most araneomorph spiders range between $2N = 24$ and $2N = 36$.

PATTERNS OF SPINATION

The cuticular structures referred to as spines both here and in araneological literature in general, are certainly not spines in the entomological sense of the term. According to the generally accepted definition (Snodgrass, 1935), a spine is an immovable outgrowth of the entire body wall, is lined by epidermal cells, and is not alveolate. The so-called spines of spiders, presumably even the largest of them, are alveolate, hence usually movable, and are secreted

by a single epidermal cell. Therefore they are setae.

Setae of spiders fall into several intergrading categories on the basis of diameter. These are usually referred to as spines, setae, and hairs. The distinctions among these three setal classes are useful and the terms are firmly fixed in the literature. I have continued to use all three words in their araneological senses in preference to causing confusion by the introduction of unfamiliar or newly-coined words.

Most of the leg spines of *Ariadna* are borne on the metatarsi, tibiae, and femora. Occasionally there are one to a few on the patellae. In later instars, spination of juveniles is like that of females. Second instar juveniles have a female pattern of spination, but the number of spines is much smaller than in adults.

Femoral spines in mature specimens of both sexes are limited to the upper surface of the segment, except on the first, and rarely the fourth, leg. Females have, on the distal prolateral surface of the first femur, a single long slender spine. Two species, *A. gracilis* and *A. multispinosa*, have two or three such spines on each first femur (Figure 7). The constancy of these spines is almost one hundred percent in females and in juveniles after the first molt. In males the prolateral spines of the first femur are often suppressed. Usually the spines are still represented by setae that may be set in enlarged sockets or be somewhat spiniform, indicating their homology with the spines of the female.

In both sexes the spines of the upper surfaces of the femora are arranged in three longitudinal rows. One row runs along the dorso-median axis of the femur, the other two along the lateral margins of the upper surface. The cylindrical cross-section of the femur makes delimitation of dorsal and lateral surfaces somewhat ambiguous. All three spine rows have been arbitrarily termed dorsal, although the lateral ones show some tendency to "slip" down onto the lateral surfaces of the femora.

Dorsal spination of the femora is reduced or absent in females but strongly developed in males. In females, retention of a single distal spine of the inner row on femora II and III (in about ten percent of the individuals) represents the lower extreme in spine reduction. A common pattern in females is a distal circle of three dorsal spines, one in each row. At the observed upper limits in females are found two spines in each of the outer and middle rows, and three in the inner, in a few individuals. The spination of each of the four femora varies in an individual, usually by a reduction in the number of spines posteriad. Occasionally the fourth femur will bear a variable number of spines basally in the middle row.

The number of dorsal femoral spines is highly variable in males both intra- and inter-specifically. The range in the specimens examined was zero to thirteen on a single femur. The majority of the spines are usually in the middle row. The lateral rows often equal each other in spine number.

On the tibia, the ventral spines occur in two rows, which on legs I and II are almost always present in both sexes (Fig. 3); in males, however, the lateral spines occur in one or more rows and are almost always present; if present in females, the lateral spines occur in one row. The dorsal spines rarely occur in males; and a "super-numerary" spine just outside the basal spine of one or both ventral rows in males. Variation in the number of tibial spines is considerable in the genus, but often very slight within a species. In females, lateral tibial spines on the first two legs are usually either present in numbers or almost entirely absent in a given species. The number and arrangement may be variable in a species that has them. Particular patterns are indicated in the species descriptions.

The metatarsi bear a larger and more variable number of spines than the other

podomeres. Only the main features of the variation can be dealt with here. In females on legs I and II, there are two ventral rows of spines, usually with seven to thirteen spines per row (Fig. 13). Metatarsus III also bears two ventral rows, but rarely has more than three spines in the outer and two in the inner row. The fourth metatarsus has a distal comb of spines on the inner ventral surface. This comb is made up of a transverse row of two to eight modified spines set in contiguous sockets (Fig. 31). Elsewhere on the podomere, spines are few or absent. Lateral metatarsal spines occur sporadically in females except on leg III, which usually has one or two prolateral spines.

Metatarsal spination in males is very different from that in females, except on the fourth metatarsal comb, which is alike in the two sexes. The sexual differences in metatarsal spination consist of reduction in the number of ventral spines, and addition of lateral and sometimes dorsal spines in the males.

Male first leg. Of the American *Ariadna*, sixteen males are known. Eleven of these have the metatarsus of the first leg modified in some way. The presence or absence, and the particular form, of this modification furnish the best species characters for the males.

The modified metatarsi are either transversely sinuous or sharply bent (Figs. 41, 51). If sinuous, they are also usually slender, and may bear one or two conical projections. If sharply bent, the metatarsi are thicker and bear one or two lateral projections. In either case, the projections may bear spines (Figs. 32, 33).

In those males that have heavy first metatarsi with lateral projections (apophyses), modified spines occur on the first tibiae. These spines are very short, flat, and wide, and occupy the distal part of the inner ventral row of tibial spines. The number of spines so modified varies from one to three.

DEVELOPMENTAL AND TRAUMATIC CHANGES IN SPINATION

Spination in adults of a given species of *Ariadna* is slightly to moderately variable, depending upon which surface of which podomere is considered. The maximum variation noted in a single character (the number of spines in the ventral rows on metatarsus I) was plus or minus five from the range midpoint. The minimum was minus one spine (first femur, prolateral) where the modal number was one. In this case, variation was quite rare. Of the total number of spine characters, about twenty percent fall into the category of slightly variable; that is, their constancy is ninety percent or more. However, among several hundred adult *Ariadna* examined, not one specimen had a completely symmetrical spination, and no two specimens had the same spination.

The question of the basis of this variation immediately arises, especially because at least some characters appear to be under rather strict genetic control.

Comparison of young specimens of *A. bicolor* with adults of the species provides a partial answer to this question. Five broods of young were available produced from eggs laid in captivity. The spiderlings were known to be in the second instar. One brood was from Massachusetts, two were from Ohio, and two from Florida.

Ariadna, as other spiders, hatches from the egg as an unpigmented spiderling without hair, setae, or spines. It molts almost immediately upon freeing itself from the chorion. The second instar is provided with setae and spines, which may be less well differentiated from each other than they become later. In all five broods of *A. bicolor*, not only was every individual symmetrically spined, but each was spined exactly the same as the others, with one minor qualification: occasionally one of the spines was so slender that it resembled the irregularly arranged setae. However, its position indicated its nature clearly.

All spines at this state are relatively much slenderer than in the adults.

The second instar leg spines of *A. bicolor* consist of two rows of three each on the ventral surface of tibia I, an outer row of three and a single inner spine on the ventral surface of tibia II, a single ventral spine on metatarsus III, two spines in the comb on metatarsus IV, and a single prolateral spine on femur I.

The spination characters showing the greatest constancy in the adults are present in the second instar in almost their final number. The addition of only one spine to each of the ventral tibial rows and one to the metatarsal comb produces the spine number found in 90 percent or more of the adults. The prolateral spine on femur I remains single.

The addition of these spines almost always takes place at the second or third molt, after which, in these particular characters, there is usually no further change with subsequent molts. No statistically significant change in any feature of spination occurred during the last molt in the few samples examined for such a change.

The ventral spine rows of metatarsi I and II are the most variable of the spination characters. There appears, however, to be a fairly regular pattern of addition of spines. The second instar, as noted above, has three spines in each of these rows. In the adult, the proximal and distal spines, and the one at the middle of each row, are of about equal length and are much longer than the others. These long spines are believed to be the original three found in the second instar. Between these "primary" spines are others of varying lengths.

In general, the distal spine in a series between two primaries is the longest, and the lengths of the others gradually diminish proximally until the next primary is reached. Sometimes there may be a long "secondary" spine interrupting the series, breaking the series into two shorter ones that repeat the same pattern (Fig. 13). I believe that the length of a spine is an

indication of the molt at which it appeared, and that rearing of a few species will reveal enough of the pattern of addition of spines to allow aging of specimens on the basis of their spination.

The uniformity of juvenile spination suggests that the genetic basis of spination in *Ariadna* is either subject to little variation or is highly canalized, and that the variability in adult spination should be attributed largely to developmental "accidents." Until large-scale rearing of *Ariadna* has been carried out, little can be said about the effect of environmental conditions on development and variation of spination. A few observations derived from preserved specimens are of interest, however.

Differential expression of a particular spine pattern is obvious in preserved material, and is of frequent occurrence. It is most noticeable in males. The number of spines in the ventral metatarsal rows of males is small, usually two or three spines per row, as compared with six to twelve or more in the females. In the wide spaces between the spines of the male, setae with slightly enlarged bases and sockets often occupy the spots where the spines of the female would be. The male pattern of spination on this segment may perhaps represent a suppression of the spines that have been added since the second instar, but the suppression is not necessarily complete.

The same sort of effect is occasionally observed in females. A spine row that "should" contain four evenly spaced spines may have a conspicuous gap in it. Standing in the gap may be a seta which corresponds to the missing spine. The phenomenon in both sexes suggests that, if we had any knowledge of the genetics of *Ariadna*, we might be speaking here of the expressivity of a gene.

In cases such as the above the trichogen cells that produce the spines fail, either completely or partially, to function. There are also cases of overfunctioning or appar-

ent duplication of these cells. In some males, the spines of the first metatarsi or tibiae are greatly thickened or widened as compared with the other leg spines (Fig. 40). Rarely an individual of either sex will be found in which a spine is slightly or deeply bifid at the tip. In a few of these cases the division extends to the base, so that two spines, closely appressed to each other, stand in the same socket. Too little is known of the histology of *Ariadna* epidermal cells to warrant suggestions of reasons for most cases of developmental duplication or multiplication of spines.

Traumatic effects upon spine number are much more easily dealt with. Seizure of an appendage by another organism nearly the size of the spider or larger will usually result in the spider's sharply twisting itself free of the trapped appendage. No reflex autotomy occurs, but there are weak points in the appendages, and breaks at these points seal themselves off rapidly. If an appendage is severely mangled but not pulled off, the spider will itself later break off part or all of the appendage. Provided the animal has at least one more molt in the offing, no sooner than several days after the injury, the lost appendage will be regenerated.

Regenerated appendages are at first smaller and paler in color than the original ones, and customarily have a reduced spination. With each further molt they become more like the unregenerated appendages, but probably rarely catch up with them, except in female mygalomorphs. Although reduction in the number of spines is general in regenerated appendages, the particular pattern assumed by the spines is not very predictable; various irregularities have been observed.

An injury that does not result in autotomy of the appendage heals, leaving a localized scar. If a molt follows, various results may be observed. One specimen I examined had a gap in a spine row with an area of pale cuticle where the spines were missing. Examination of the exuviae

of the previous instar of this individual showed a healed wound covering an area which should have borne two to four spines. Perhaps a superficial injury might heal without effect upon spination, but such a result would be difficult to detect in field-collected material.

Of especial interest is a specimen of *A. bicolor*, in which one of the metatarsal rows contained 19 spines, the maximum number for the species otherwise being 12. Near the distal part of the segment, a cluster of half a dozen spines occupied a semicircular area lateral to the rest of the row. These extra spines were oriented in various directions, not extending diagonally down and forward as did the other spines of the row.

Probably a small wound lateral to the spine row had occurred in an earlier instar. The multiplication of trichogen and tormogen cells, and their migration to the wound area during healing, would result in the production of supernumerary spines in an abnormal location. Wigglesworth (1954) describes the experimental production of this effect in the hemipteran *Rhodnius*.

In summary, then, it appears that a large portion of the variation in spination in adult *A. bicolor* is produced by transient or local physiological changes, including trauma. The extent to which varying environmental conditions might produce a harmonious variation of the spine pattern is unknown.

SPECIATION IN THE GENUS *ARIADNA*

To be able to point out lines of evolution among the American *Ariadna* that could be supported by considerable evidence would be gratifying. Unfortunately, this does not yet seem possible. Because of the paucity of material of many species and the morphological and ecological conservatism of the genus, differences are relatively few and slight in most cases. Morphologically, any one of the American species

could probably have given rise to any of the others. Nevertheless, some possible relationships are apparent. It must, of course, be borne in mind that the following discussion is quite tentative and may require extensive change when more material becomes available.

Three groups of species are moderately well defined. Not all of the species fit into these groups, and the placement of some species in the groups is ambiguous.

The *bicolor* group includes a series of species that occur from North America through Mexico, in the mountainous portions of western South America, and on several islands adjacent to the Mexican or South American mainlands. In this group are the widespread North American *A. bicolor*, *A. pilifera* of the U. S. and Mexico, *A. pragmatica*, *A. weaveri*, *A. caerulea*, *A. cephalotes*, *A. murphyi*, *A. peruviana*, and *A. maxima* of Chile. Two other species, *A. isthmica* from Central America and *A. towarensis* from Venezuela, may belong here also.

Five of these species are grouped together by one of the more satisfactory of the Mahalanobis' distance analyses, shown in diagram 7 of Beatty and Bossert (in prep.), and other methods of analysis associate several of them. Although *A. bicolor*, *pragmatica*, and *caerulea* are placed further from the above group than most other species, they decidedly belong in the group. *Ariadna bicolor* is actually quite similar in both sexes to *A. pilifera*. The distinctions between the species are primarily the increased numbers of spines on most appendages in the females of *A. pilifera*. The modifications of the male first metatarsi are very much alike. (Male characters were not included in the calculation of Mahalanobis' distance.)

The elevational range inhabited by these species is almost totally unknown except for *A. bicolor*, recorded from near sea level to 7000 feet (0–2130 m), and *A. pilifera*, taken from about 2700–7500 feet (800–2300 m). It appears likely that this species

group represents a diversification of a stock that was distributed throughout temperate North America and the mountainous areas of South America. Independent migrations from various parts of this range are the probable origins of *A. pragmatica* on islands in the northern Gulf of California, *A. weaveri* on Clarion and Socorro Islands, *A. murphyi* on the Chin-chas Islands off Peru, and *A. maxima* on the Juan Fernandez Islands.

The central American *A. isthmica* and Venezuelan *A. towarensis* are somewhat similar to the members of the *bicolor* group, but apparently occur primarily in tropical lowlands, and are only doubtfully to be included in this group.

All eleven of the above species are characterized by the presence, in the females, of two ventral rows of four spines each on the first tibiae, and an outer ventral row of four spines on the second tibiae. The inner ventral row on the second tibiae contains two spines in *bicolor*, *pilifera*, *pragmatica*, and *weaveri*, the northernmost members of the group; three spines in *cephalotes* of Colombia and Ecuador and *towarensis* of Venezuela; and four spines in the other members of the group. The metatarsal comb contains two spines in *murphyi* and *pragmatica* (both island-inhabiting species); three in *bicolor*, *weaveri* and *peruviana*; and four in the remaining species. Only modal numbers are given for these characters. Except for *pilifera* and *caerulea*, however, there is relatively little intraspecific variation in the characters.

Male characters, as far as they are known, show some agreement with this grouping. Of the four American species that have prominent spurs on the first metatarsi and enlarged spines on the first tibiae, three, *bicolor*, *pilifera*, and *peruviana*, are in the *bicolor* group. The fourth species showing these modifications, *gracilis*, is morphologically far removed from most species of the genus. It is obvious, however, that the male leg modifications

and the female spination are not strongly correlated with each other. The other eight members of the *bicolor* group include males with sinuous first metatarsi without spines and others with unmodified metatarsi that are entirely spineless. Grouping of the species on the basis of male characters produces a similar heterogeneity of female spine patterns within each group.

The *arthuri* group includes *A. arthuri*, widespread on islands in the Caribbean, *A. multispinosa* in Hispaniola, and *A. tarsalis* in the Galapagos Islands. In these species, the first and second tarsi have more than four spines in each ventral row. The modal number for each row in *arthuri* is six. Too few specimens of the other species are known to establish a meaningful mode, but the observed range is four to nine in *tarsalis* (three specimens) and eight to eleven in *multispinosa* (two specimens). All but one of the specimens of the latter two species are immature. Only two other species show a similar tibial spination: *tubicola* from Venezuela and *gracilis* from the Amazon Basin. Both of these species are rather strongly divergent from the rest of the genus. The only affinities either of them show are weak ones with the *multispinosa* group.

The *multispinosa* group appears to be distributed on the Caribbean and Galapagos Islands with further speciation on Hispaniola. Since, in spite of their sedentary habits, *Ariadna* species are quite successful colonizers of new territory, one might expect a mainland member of the group to occur in Mexico or Central America. Prior occupation of this area by other species of the genus would, of course, reduce the possibility of such an occurrence. In fact, however, a single mature female collected by me in north-eastern Mexico near Monterrey appears to be a new species of the *multispinosa* group. Because only one mature and a few juvenile specimens are on hand, the species has not been described. No other species

from North or Central America resembles the *multispinosa* group in spination.

In this group, *arthuri* and *tarsalis* each have two spines in the metatarsal comb, *multispinosa* has four. It is curious that, of the five American species in which the comb contains only two spines, all but *obscura*, from eastern Brazil, inhabit islands. Two other island species, *weaveri* and *peruviana*, have three comb spines, *solitaria* has four.

The third species group centers around *A. mollis* of southeastern Brazil, Uruguay, and Argentina. Other species of the group are *boesenbergii* and four as yet unidentified species known from the São Paulo and Diamantina areas in southeastern Brazil. The latter four species probably include *A. crassipalpus* Blackwall, *A. conspersa* Mello-Leitão, *A. dubia* Mello-Leitão, and *A. spinifera* Mello-Leitão. In the absence of type specimens, it has so far proved impossible to assign the available specimens to any described species. They may not all belong to the *mollis* group, but certainly most of them do. According to the computer analysis, *A. boesenbergii* and, to a smaller extent, *A. mollis* link the *mollis* and *bicolor* groups.

Ventral spination of the first two tibiae in the *mollis* group is generally like that of the *bicolor* group. The metatarsal comb contains four or more spines in all members of the *mollis* group. Both sexes of *mollis*, *boesenbergii*, and two of the unidentified species, are known. In all of these, the carapace and abdomen are predominantly light in color, and in *mollis* and *boesenbergii*, there is a conspicuous pattern of light and dark bars on the abdominal dorsum. It is impossible to be sure whether the unidentified species referred to above did or did not have a pattern in life. The pattern can be destroyed by poor preservation.

The material of the other possible members of the group consists of two distinctly different males, one from Diamantina and one from São Paulo, and several females

from São Paulo. It is not possible to match either male with the females with any acceptable degree of probability. The females are all very dark in color, in contrast with other members of the group. They may belong elsewhere.

It appears possible that the La Plata River may have acted as a barrier permitting differentiation of an originally single stock into *A. boesenbergii* to the north and *A. mollis* to the south. Later migration would then result in the observed occurrence of both species on both sides of the river at the present time. Too little is known of the actual present distribution of either species, however, to do more than point out the possibility. Mello-Leitão cited the occurrence of both species at several localities not shown on the distribution map (Map 2) but, since he once incorrectly synonymized the two species, his identifications cannot be relied upon.

This genus presents more interesting problems in the area occupied by the *mollis* group than it does anywhere else in the Americas. Of these problems, the nomenclatural difficulty is the most obvious, but least interesting. Once the Mello-Leitão types become available, the proper names should be easily assignable to the specimens.

Of much greater interest is the fact that, in all of the Americas, only in the area from southern Brazil to northern Argentina is there definite evidence of sympatry of two or more species of *Ariadna*. A collection from Diamantina contained a male of *A. boliviana* and one of the unplaced males mentioned earlier. Another collection taken in Buenos Aires contained two female *mollis* and two female *boesenbergii*. Collections from the immediate vicinity of São Paulo include at least three and possibly four species, none as yet identified.

Field study of the microhabitat choice and general ecology of *Ariadna*, especially in the São Paulo region, should provide data on division of habitat and might suggest some reason for the allopatry of

most American species. In general, a given species of *Ariadna* appears to be able to tolerate a wide range of climatic conditions as long as its preferred microhabitat is available. As a result, most species have an extensive geographic range, unless they occur on islands. Even one island species, *A. arthuri*, ranges over a large area (Map 4). How four species of these spiders, conservative as they appear to be in choice of microhabitat, can occupy a small area simultaneously is at present a seemingly insoluble puzzle.

The occurrence of *mollis* and *boesenbergii* together, apparently at a single collecting site, is of interest for a further reason. A single vial received from the Museo Nacional de Ciencias Naturales in Buenos Aires contained two females of each species. All four specimens had been identified as *A. mollis*.

Although it is difficult to assess the degree of similarity or difference in such a generally uniform genus, to the naked eye, *mollis* and *boesenbergii* are certainly very similar in appearance. They are the only two species of the genus with a conspicuous abdominal color pattern, they are of about the same size, and they show no more than an average number of differences from each other in spination. Although they may not be the most similar pair of species in the Americas, they are not far from being so. This is exactly the reverse of the phenomenon of character displacement which has gained considerable attention recently. (I might add that I have yet to see any strong evidence for the occurrence of character displacement in any spider species. It must be admitted, however, that no one has made a careful search for it.) Whether any sort of behavioral or ecological displacement occurs in these species is not known.

The remaining species, not placed in any of the above groups, are either divergent from the three described groups or are at the moment unplaceable. Three of them, *boliviana*, *obscura*, and *solitaria*,

may be related to the *bicolor* group. However, only a single female of *obscura*, one juvenile of *solitaria*, and one female and two males of *boliviana* have been seen. Without more material, I prefer to leave them unassigned.

Three species, *tubicola* from Venezuela, *gracilis* from the Amazon Basin, and *fidicina* from the Pacific Coast of North America, are the most divergent of the American species. Except for some possible connection of *gracilis* with the *multispinosa* group, none of them is similar to any other American species (as close similarity goes in this genus). It is especially unfortunate that among these three species, both sexes are known only for *A. gracilis*.

No further speculation on the evolution of *Ariadna* in the Americas appears worthwhile at present. Until the Old World fauna of the genus is revised, and much more collecting has been done in the southern hemisphere where many undescribed species probably exist, no reasonable phylogeny can even be suggested, much less defended. Study of the ecology and behavior may provide clues to the evolutionary history of the genus, but if the animals are as uniform in these characters as they are in morphology, solution of the problem will be difficult.

TAXONOMIC CHARACTERS IN HAPLOGYNE SPIDERS WITH PARTICULAR REFERENCE TO THE GENUS ARIADNA

The haplogyne spiders (Haplogynae) include the families Plectreuridae, Diguetiidae, Scytodidae, Sicariidae, Dysderidae, Caponiidae, and Oonopidae. They are two-lunged or lungless spiders with simple external genitalia. This simplicity is regarded as primary and primitive. Palpi of the males lack hematodochae, the inflatable membranes that expand the palpal organ, and often consist of a simple globose bulb that tapers to a spinelike embolus. In a few families (e.g. Diguetiidae, Dysderidae), the bulb may be subdivided, with a

conductor, but the palpal organ never approaches the complexity usual in higher araneomorph spider families. The female has a patch of slightly differentiated cuticle in the genital area, but other external genital structures are either absent or consist only of shallow depressions.

For about 100 years, araneologists have relied heavily upon external genitalia for distinguishing among species of spiders. The genitalic simplicity of the haplogyne families sharply reduces the usefulness of the genitalia as specific characters. The taxonomy of haplogyne spiders, and of mygalomorphs (orthognaths), which also have simple genitalia, has therefore been considered difficult, and has been relatively neglected until recently.

In descriptions of haplogyne spiders, a wide variety of specific characters has been used. The palp of the male, sometimes the genital area of the female, the spermathecae of the female, the number and arrangement of the eyes, the number and dentition of tarsal claws and cheliceral teeth, the shape of the sternum, the length and proportion of the legs, and the spination of the appendages have each been described by one or several authors as being distinctive of certain species.

Heretofore, no attempt has been made to determine the range of variation of "diagnostic" characters within populations of a species, or, at least, the attempt has not been reported. The validity of many species is therefore questionable.

METHODS

Examination of the genus *Ariadna* for usable taxonomic characters involved several steps. The literature was searched, and a list of diagnostic characters employed in the genus was drawn up. Next, specimens of several species were examined for the possible existence of additional characters that had not previously been used taxonomically. With an extensive list of characters prepared, numerical data for

each specimen were recorded, and the results were analyzed to determine whether they would provide statistically significant characters.

In published descriptions of *Ariadna* species, almost every external feature has been described at least once. The selection of characters by a particular author seems, however, to have been based only on whatever happened to strike his eye. Only occasionally have supposedly diagnostic characters been pointed out, and uniformity, system, and completeness are absent. Often the characters are reported incorrectly. Bryant (1948), Chamberlin (1916), Mello-Leitão (1916, 1947), Petrunkevitch (1926), and Simon (1891, 1893a) all reported that the fourth legs, in species of *Ariadna* they described, were entirely spineless. Examination of hundreds of *Ariadna* specimens, including types of species described by the authors cited, reveals that the fourth leg is never spineless in *Ariadna*, except in very small juveniles, and even there only rarely. This mistake led to an erroneous statement in Chamberlin's diagnosis of *A. murphyi* (1920) in which he states "metatarsus IV, armed at distal end of leg instead of leg IV being wholly unarmed."

Various authors (Blackwall, 1858, 1863; Mello-Leitão 1917; Petrunkevitch 1929) have described the chelicerae as being without teeth, or have given an incorrect number of teeth. Again, the descriptions were shown to be in error by examination of one of the specimens seen by these authors, and by the constancy of the number of cheliceral teeth in many other specimens.

It was also common practice to describe the ventral spination of the first and second tibiae and metatarsi as consisting of some number of pairs of spines. The spines are, in fact, not arranged in pairs, but in two distinct longitudinal rows (Fig. 13). The two rows often do contain the same number of spines, but more often they do not. Even when the two rows are equal in spine

number, the spines are not always opposite each other. The only notation of spine position that proved satisfactory in this study was one based on the potential presence of one to four longitudinal rows of spines on each of the leg surfaces (see p. 438).

The examination of specimens revealed no new categories of characters, but it did show that many more characters were available than had previously been used in descriptions of new species. The inaccuracy of many such literature reports was clearly demonstrated. The list of characters ultimately settled on for intensive investigation and statistical analysis included the entire spination of the appendages, the cheliceral teeth, and a series of measurements. Other characters were omitted as being unsuited for statistical treatment.

Data were recorded on IBM cards and analyzed by the IBM 7094 computer at the Harvard Computation Laboratory. Methods and results of the analysis are discussed in a separate paper (Beatty and Bossert, in prep.).

ASSESSMENT OF THE CHARACTERS

For data on intraspecific variation in these characters, see Tables 2 to 23.

The number of cheliceral teeth proved to be a generic character. All species of *Ariadna* normally have three teeth on the promargin and one on the retromargin of the fang furrow. Variation from these numbers is infrequent.

Spination of the palpal patella, ordinarily the presence of one spine as opposed to the complete absence of spines, was a useful character in many instances. There is a small to moderate amount of variation, usually not bilateral. A small series of specimens would be sufficient to show the normal condition in all species. The spines of the tibia and tarsus of the palp are highly variable in number. Only occasionally was the difference between two species

significant, and even then only unilaterally. Ranges in spine number on these segments usually overlap to such an extent that they are unusable as specific characters.

The spines of the first two legs present most of the useful taxonomic characters to be found in the spination of the genus. The femur of most species bears one large prolateral spine. Variation of this character in females and juveniles is virtually absent. (In males the spine is often suppressed.) Two species, *A. gracilis* and *A. multispinosa*, have two or three spines in this position. Dorsal femoral spines are normally either present or absent. Normally spineless species may have one dorsal spine, species normally having spines usually have two to four. Overlap of the range is rare. The presence or absence of prolateral and retrolateral spines on the tibiae is a very useful character. In species having lateral spines on these segments, difference in the number of spines is usually not helpful.

Ventral spination of the tibiae is an excellent character, particularly that of the inner ventral row of the second tibia. With respect to the basic pattern of spination on this surface, there are two groups of species: in the first group the maximum number of spines in all rows is normally four, in the second the minimum is normally five. In most species of the first group, the variation is only slight, but in *A. pilifera* and *A. caerulea*, it is considerable. Among the species in the second group, the number of spines per row is much less constant. In all species, the inner ventral row on tibia II is least variable within a species, and it also shows considerable interspecific variation. The ventral rows of spines on the metatarsi usually have the widest range of variation of any spination character. Nevertheless, given a small series of specimens, they provide useful supplementary characters at least for species that fall near the ends of the range of intrageneric variation.

Most spine arrangements of the third

leg are not taxonomically useful. The ventral and lateral spines of the metatarsi are the most constant intraspecifically, but the range of interspecific variation is slight. Ventral spines of the tibiae are more variable intraspecifically, and also show a small range of variation from species to species. No character derived from the spination of the third leg can be considered often useful.

The spination of the fourth leg, although denied existence by many authors, does provide one very useful character: the number of spines in a peculiar comb found on the inner ventral surface at the distal end of the metatarsus. This comb contains two spines in some species, three in a few others, four in many, and more than four in a few. Variation is slight, again with the exception of *A. pilifera* and *A. caerulea*. One or two spines are often present in an outer ventral row on metatarsus IV. Other spines of leg IV are usually dorsal or retrolateral on the femur, or ventral on the tibia; their occurrence is sporadic.

The differences in measurements almost all resolve themselves into differences in overall size. The proportions of body and legs are remarkably constant throughout the genus. Here and there a species shows a distinctive feature, such as the relatively long narrow carapace of *A. maxima* or the short distal podomeres of *A. tubicola*, but, in general, a description of the proportions of one species would suffice for most of the others. A certain tendency exists for species that are closely similar in size to be quite distinct in spination and vice versa.

The distance from posterior median to posterior lateral eyes, expressed in diameters of a posterior median eye, has been used rather extensively as a species character by earlier authors. There certainly are interspecific differences in this character, but so many variables are involved in assessing it that its use is very difficult. The eyes are so small that obtaining an accurate measurement is not easy at best,

and a slight difference in the angle at which the observed specimen is positioned under the microscope makes a great difference in the distances being measured. Even with careful measurement, it was found that the intraspecific variation is considerable as compared with that mentioned in published descriptions. I have felt that some use of this character should be possible, because the differences between some pairs of species are striking to the eye. Thus far, however, no generally satisfactory method of describing the character has been found.

Characters not included in the statistical analysis are the following.

Color was often described at length by early araneologists, and was used as a diagnostic specific character. But the hue, being likely to vary rather extensively within a species, is not especially reliable, whereas the pattern of coloration may be. In *Ariadna*, three groups of species are distinguishable on the basis of hue and pattern. One group is composed of species of light coloration, the abdomen ranging from whitish to yellow-orange, the carapace from yellowish to deep red-orange. A second group is dark, with the abdomen purplish gray to dark brown, the carapace brownish or deep mahogany to almost black. Neither of these groups shows any distinctive color pattern on the abdominal dorsum. The third group contains a few species having a distinct dorsal abdominal pattern of yellow transverse bars on a purplish gray or brown background (Fig. 1).

Only the abdominal pattern is consistently usable as a diagnostic character. Color variation is extensive in many species, sometimes, although rarely, to the degree that an adult individual of a normally dark species may be of a light color. The first instar young are, of course, unpigmented, and darken gradually as they mature. Newly molted individuals are whitish, and darken over a period of days.

In a few species of *Ariadna*, dark annuli

are present on the legs. These seem normally to be constant, although the number of specimens on hand is relatively small. The presence or absence of these annuli will quite likely prove to be a useful diagnostic character.

The density, length, and color of the pilosity have been used in *Ariadna* taxonomy. They can, under the proper circumstances, be helpful, but are too variable to be diagnostic. Further, their proper use requires recently collected specimens, preferably ones which have molted only a short time prior to collection. In the normal activity of the spider some of the hair may be lost, and in preserved specimens the hair is often almost completely rubbed off, especially from the legs.

In his description of *Ariadna pilifera*, O. P.-Cambridge (1898) said, "Behind the posterior extremity of the sternum, between the coxae of the fourth pair of legs, is a small but distinct shining reddish brown chitinous plate of a truncate conical form, apparently beneath the connecting pedicle; on each side of it is a small oblique slit or orifice (perhaps spiracular openings?) The shape of this plate is probably a good specific character." The plate referred to is a ventral sclerite of the pedicel. It is of no taxonomic use, its shape being practically invariable from one species to another. Portions of the sclerite are often partially covered by folds of the thin adjacent cuticle. These folds may have produced the appearance of lateral slits noted by Cambridge. I failed to find any such slits. Accurate observation of the shape of the sclerite is hindered by the cuticular folds, and efforts to uncover it are likely to damage the specimen.

The structure of the male palp is quite useful in distinguishing species of *Ariadna*, even though it may not always be completely diagnostic in itself. The differences of greatest importance are the size of the organ relative to the size of the spider, and the length, thickness, and curvature of the embolic portion. The palp

is more effectively described by drawings (Fig. 12) than it is in words; its generally small size and the helical curvature of the embolus make accurate and consistent measurement of a series of specimens almost impossible. Proportions of the palpal organ do not present noticeable intra-specific variations, but the small number of males of most species in collections has prevented any significant study of variation.

The metatarsus of the first leg of the male is perhaps the best single diagnostic character found in *Ariadna*. It shows striking interspecific variation in diameter, curvature, spination, and possession of apophyses (Figs. 20–23, 50). The intra-specific variation shown by the only adequate sample of males (*A. bicolor* from Pennsylvania) does not affect the overall appearance of the metatarsus. Unfortunately, males of only about half the American species are known.

The female has no epigynum, there being only a shiny, brownish, somewhat elevated patch of cuticle in the genital area. The internal genitalia present no usable taxonomic characters. There is a single median "seminal receptacle," which probably does not actually receive sperm. Dorsal and posterior to the receptacle is a large membranous bursa copulatrix. Both receptacle and bursa have a uniform structure throughout all the American species.

A TAXONOMIC REVISION OF AMERICAN ARIADNA

In spite of the phylogenetic position accorded the haplogyne spiders, the taxonomic problems they present have not, in the past, been fully appreciated or adequately studied. Most araneologists have placed the haplogyne families at or near the base of the araneomorph line. The genitalic simplicity has been viewed as primitive, and other characters are believed to provide supplementary evidence of primitiveness.

If these families are really the most primitive araneomorphs, they offer, in the absence of an adequate fossil record, probably the best material for a study of spider evolution. If the lines of evolution leading from mygalomorph to advanced entelegyne spiders are distinguishable anywhere in living animals, they should be found among the haplogynes. Until very recently the haplogynes have, unfortunately, been among the least known groups of spiders.

During the past several years, revisions of some primarily North American haplogyne families have been published (Gertsch 1958a, b, and c). Currently, Cooke in England and Alicata in Italy are studying the dysderid subfamily Dysderinae, and in America, Chickering is studying the family Oonopidae. But these studies constitute only a beginning of an understanding of haplogyne spiders. The fauna of the south temperate regions has been little examined. There is reason to believe that this fauna, when it becomes well known, may change our ideas of haplogyne classification drastically. Further, the studies mentioned above still rely heavily on genitalia for separating species, although females within a genus of haplogynes may be completely indistinguishable on this basis.

Because of the absence of complex secondary genitalia, araneologists seem to have been at a loss for convenient species characters. The usefulness of characters other than genitalia, eye arrangement, and a few other obvious and traditional features, has been only slightly explored. It must be admitted that some haplogyne spiders actually have fewer external morphological structures than entelegyne spiders, and that identification of females in such genera may be extremely difficult.

The excellent revisions of plectreureids, diguetids, and loxoscelids by Gertsch (1958a, b, and c; 1967) take into account leg length and proportions, spination, size, and eye relationships, in addition to geni-

talia. Even with these additional characters, the genus *Loxosceles* remains a difficult one to deal with. A paper by Cooke (1965b) is the first extensive investigation of non-genitalic morphological characters of haplogynes known to me.

This present study, therefore, has been undertaken not only to provide a much needed revision of the genus *Ariadna*, but also to provide clues to kinds of characters that may prove useful in other genera or families of haplogyne spiders.

METHODS

Measurements. Specimens were measured by the use of ocular grids in binocular dissecting microscopes. A variety of microscopes and grids was used for making measurements, so that neither the magnifications nor the limits of accuracy of the figures are constant. In general, however, the measurements are accurate to about one-tenth unit of the micrometer grid, as is shown by repeated individual measurements. For the larger dimensions, the measurements are accurate to 0.1 mm, for the smaller dimensions to about 0.015 mm. Measurements were made with the specimen in as nearly horizontal a plane as possible, along the lines shown in Figures 5, 8-9, and 15.

A series of 24 measurements of various parts of each specimen was taken. Relatively few of these proved useful in species discrimination (see Beatty and Bossert, in prep.). The range and mean for total length, carapace length and width, and sternum length and width are given in the species descriptions.

Figures and descriptions. The color descriptions are based upon alcoholic specimens, collected as recently as possible. Comparison of old museum specimens with living specimens of the same species shows that *Ariadna* generally retains its color well in alcohol, provided the initial preservation was properly done. The carapace and appendages change color very slightly and

slowly, if at all. The abdomen is the most sensitive to improper preservation, and the most likely to change with increasing length of time in preservative. Well-preserved specimens that have not been allowed to dry and have not undergone shrinkage of the soft parts away from the cuticle do not differ noticeably in color from living specimens unless they are quite old (fifty years or more).

Illustrations were made with the aid of a camera lucida, usually at a magnification of 12× or 20×. In most cases only line drawings are presented. Color patterns are present in few species of *Ariadna*.

A few drawings are presented to show the general appearance and structure of the genus (Figs. 1-7, 11-14). Structures of the cephalothorax and appendages of the females are so uniform that there is no reason to present drawings of these parts for each species. Similarly, the female genitalia have not been useful in distinguishing species. The illustration given for one species (Fig. 14) serves equally well for all others. Two views of the male palpi are shown, from the prolateral and retrolateral aspects. The first metatarsus and tibia of the males are illustrated in dorsal view. Hair coverings are omitted from most drawings.

Records. For most species few specimens were available and all records are given. For the United States, locality records are listed alphabetically by state, and counties of the states are also listed alphabetically. Specific localities are given for most species. For the common and widespread *A. bicolor*, only states and counties are recorded.

The major geographical areas are listed in geographic order, beginning in the north. Caribbean islands are listed alphabetically under West Indies. States and territories of Latin American countries are listed alphabetically.

The number of specimens collected at each locality is given. In addition to the ♂ and ♀ symbols used to represent mature

specimens, "o" represents immature individuals. Occasional collectors are named in the text.

Family DYSDERIDAE

Dysderides C. L. Koch, 1837, Übersicht des Arachnidensystems, vol. 1, p. 20.

Type genus of family: *Dysdera*, Latreille, 1804.

Subfamily SEGESTRIINAE

Segestriinae Simon, 1893, Histoire Naturelle des Araignées, vol. 1, p. 319.

Segestriidae: Petrunkevitch, 1933, Trans. Connecticut Acad. Arts Sci., vol. 31, pp. 333, 365. In this paper, Petrunkevitch raised the subfamily Segestriinae to family rank.

Type genus of subfamily: *Segestria*, Latreille, 1804.

Ecribellate, haplogyne spiders of the suborder Araneomorphae (=Labidognatha). Respiratory system consisting of a pair of book lungs, and tracheal tubes opening through a pair of spiracles just behind the lung slits. Heart with two pairs of ostia. Colulus small but conspicuous, short and wide, bearing several setae. Six spinnerets set close together, short, the anterior and posterior pairs two-segmented, the median pair one-segmented. Anal tubercle wide, and anteroposteriorly compressed. Chelicerae barely united at base only, without apical lamina, normally bearing three prolateral and one or two retrolateral teeth. Labium longer than broad, not fused with sternum. Endites long, parallel, not converging in front of labium. Eyes six in three diads, the anterior median eyes lost. Tarsal claws three, the two superior claws pectinate, the inferior claw with a single minute tooth. Female pedipalp with a short claw. Third pair of legs directed forward rather than backward as with most other spiders. Legs and body covered by fine long hairs, appressed to nearly erect on the body, often erect and forming a conspicuous fringe on the anterior legs. Tarsi and metatarsi often scopulate, especially in males. Rows of setae or heavy spines on the legs, especially on the two anterior pairs. Female copulatory organ

much like that of the Diguettidae and Plectreuridae, with large membranous bursa copulatrix, and a single median sclerotized structure that is probably homologous with the seminal receptacle of other spiders, but does not appear to function as a site of sperm storage. Male palpal organ a simple pyriform or long-conical bulb with a spinelike embolus, lacking any accessory structures.

Kaston (1948, 1952) followed Gerhardt and Kästner's (1938) arrangement of spider families, with some modifications, mostly the splitting of various families. This increase in the number of families was largely due to the work of Petrunkevitch (1933, 1939), and included the separation of the dysderids into Dysderidae and Segestriidae. Cooke (1965a) apparently follows this scheme also. He states: "The family is divided into four tribes: Dysderini, Harpactini, Orsolobini, and Rhodini." No segestriine genus is mentioned in his enumeration of genera of the family. Other araneologists, Bonnet (1955) for example, have continued to include the segestriines in the family Dysderidae.

The subdivision of the family was discussed by Petrunkevitch (1933) in the following words: "It seems to me now, however, more reasonable to elevate the subfamily Segestriinae to the rank of a family. They have many characters differentiating them from their nearest relatives, the Dysderinae, such as the position of the third pair of legs, the articulation of the coxae, the arrangement of the eyes. However, the tracheal system is alike in both Dysderidae and Segestriidae."

In his key in the same work Petrunkevitch distinguishes the two families thus: "Third pair of legs directed forward. Sternum separated from carapace by soft membrane as usual. Eyes in 3 diads. Family Segestriidae.

"Third pair of legs normally directed backwards. Sternum connected with carapace by hard chitin. Eyes in a transverse oval. 3 to 2 claws. Family Dysderidae."

The union of carapace and sternum, by sclerotization of the pleural membrane, occurs in a wide variety of spider families. It is a character common to all members of a family only in the Palpimanidae. From examination of a variety of specimens, it is apparent that whenever a spider becomes heavily sclerotized over much of the body (for whatever the adaptive reasons), one of the first accompanying morphological changes is that the carapace and sternum become fused to each other by sclerotization of the intervening membrane. This feature has been seen in the loricatae oonopids, some caponiids, several genera of theridiids, at least three genera of araneids, and some clubionids, in addition to the families mentioned above. These families are presently distributed among three superfamilies. In the oonopids, as in many families, heavy sclerotization is correlated with very small size, in the clubionids and theridiids also with antimimicry, in araneids with apparent protective modifications of the abdomen, and in the caponiids and palpimanids possibly with xeric habitat, although this is a guess. The fusion of carapace and sternum is apparently not a character of much significance at the family level.

The position of the third leg, held forward with the anterior two pairs instead of backward with the fourth, has been considered a unique character of the Segestriidae. Actually the araneid genus *Micrathena* shows this character also and, to judge by preserved specimens, so does the genus *Plectophanes*, variously placed in the Agelenidae or the Toxopidae. Individuals of *Dysdera* and related genera also occasionally rest with the third leg in a position midway between the forward and backward positions, almost perpendicular to the body axis.

By examining Petrunkevitch's own work, and that of Buxton (1913) and Millot (1931), both of whom he quotes, one may find many similarities between dysderine and segestriine spiders. In both groups,

in the species examined, the heart has two pairs of ostia, the cephalothorax is supplied with tracheae that originate from the second pair of spiracles, and the thoracenteron is of the simple type.

Buxton (1913) described the coxal excretory glands of various arachnids. He found that mygalomorph spiders have two pairs of glands, which open at the bases of leg coxae I and III. Each gland is made up of a saccule, a collecting tubule, a labyrinth, and an ectodermally lined excretory canal. In the araneomorph spiders, one pair of glands and the collecting tubules are absent, and the labyrinth is considerably simplified.

Variation in coxal glands within the araneomorphs is arranged by Buxton in a sequence from most primitive to most derivative. This sequence begins with the Dysderidae and Sicariidae, in which the labyrinth is a conspicuous loop and the saccule is functional. In most other families examined the labyrinth is present, but the saccule appears to be nonfunctional. Finally, in the Filistatidae, Pholcidae, Theridiidae, and Araneidae, the labyrinth has nearly disappeared so that the saccule and excretory canal are almost directly connected with each other.

The haplogyne genera examined by Buxton included *Scytodes*, *Loxosceles*, *Sicarius*, and *Dysdera*. These genera represent both subgroups of the Dysderoidea, so it is probable that the coxal gland structure is uniform throughout the superfamily.

The alleged difference in coxal articulation does not appear to exist. In both dysderines and segestriines the coxa is open distally across its entire cross-sectional area, and the trochanter articulates with the wall of this terminal opening. Proximally, the articulation of coxa and body wall in both groups is on the dorsal surface of the base of the coxa. The only externally apparent difference between the dysderines and segestriines, with respect to the proximal part of the limb, is that the base

of each coxa and trochanter is more constricted in the dysderines than in the segestriines.

Considering the differences among other spider families, the similarities between dysderines and segestriines are so many, and the differences between them so few and minor that I can find no morphological grounds for separating them at the family level. The possibility that behavioral or distributional information may support their separation can not be denied at present. Until such information becomes available, both groups should remain in the single family Dysderidae.

THE GENERA

The Segestriinae include four named genera: *Ariadna*, *Citharoceps*, *Segestria*, and *Segestriella*. *Citharoceps* of the Pacific coast of North America, and *Segestriella* of South Africa are probably not valid genera, for reasons which will be discussed below. *Segestria*, as presently known, is primarily a Holarctic genus consisting (Bonnet, 1958) of about 25 species. In the Nearctic it is limited to western North America. Seven species are cited as occurring respectively in Madagascar, India, Australia, New Zealand, southern South America, and the Galapagos Islands. The distribution of *Segestria* outside the Holarctic is very poorly known. Quite possibly a number of additional non-Holarctic species remain to be described.

Ariadna is a very wide-spread, but not quite cosmopolitan genus. Approximately 100 species have been described but, of the 41 described from the Americas, only a few more than half are valid, and the same may be true of the Old World species. Few species of *Ariadna* occur in north temperate regions. *Ariadna bicolor*, *A. fidicina*, and *A. pilifera* occur in the United States and Mexico, *A. lateralis* in Japan, and *A. insidiatrix* in southern Europe and northern Africa. The number of species

of the genus increases rapidly southward. The largest number of species will probably ultimately be found in the temperate southern hemisphere.

Except by introduction by man, no other genus of the Dysderidae has attained the wide distribution of *Ariadna*. It occurs on all continents except the Antarctic, and on such isolated islands as the Seychelles, New Zealand, the Galapagos, Hawaii, and the Juan Fernandez Islands. As presently known in the Americas, the species of this genus are allopatric, except for a region including southeastern Brazil, Uruguay, and east central Argentina, within which at least six species occur. With more intensive collecting this pattern may change drastically.

Segestriella, described by Purcell (1904), is characterized as "Allied to *Ariadna*, Aud., but differing in having the body elongate cylindrical, the abdomen obtusely produced beyond the spinners, and the fourth pair of legs very short, not reaching hind end of abdomen when stretched out, and with the femur very short and stout, strongly swollen dorsally, the width of the femur between dorsal and ventral edges about 1/2 its dorsal length and almost twice the width of the first femur." These distinctions are simply accentuations of a few characters common to the genus *Ariadna*. Purcell's careful and detailed description of *Segestriella gryllotalpa*, the only species of the genus, shows that it accords completely with *Ariadna* in spine pattern and cheliceral teeth. I have seen no specimens of *Segestriella*, but feel sure that the genus should be considered synonymous with *Ariadna*.

The genus *Citharoceps* of Chamberlin (1924) was distinguished from *Ariadna* solely on the basis of its stridulating apparatus. The files are two patches of coarse transverse grooves which extend along the sloping sides of the cephalic region (Fig. 10). The picks are tubercles at the base of each first femur on the inner surface. In most respects *Citharoceps*

agrees with *Ariadna*, although it is rather divergent in spination and proportions, and is here synonymized with the latter genus. Two species of *Citharoceps* have been described, but they seem conspecific.

Ariadna and *Segestria* have generally been distinguished principally by their eye arrangement (e. g. Comstock, rev. ed. 1948). Because placement of the eyes is often not a constant character within spider genera, Gertsch (pers. comm.) suggested that *Ariadna* and *Segestria* might not really be distinct from each other. However, Simon (1893a) used three other characters in his key to these genera: the shape of the labium, the cheliceral teeth, and the spination of the first pair of legs. Each of these appears to be a significant difference between the two genera. Further differentiating characters are found in the leg and pedipalp proportions, spination of appendages other than the first legs, the shape of the male palpal tarsus, the articulation of the bulb with the palpal tarsus, and the abdominal pattern. Although few Old World species of *Ariadna* have been examined, I consider *Ariadna* and *Segestria* separate and well-marked genera.

Table 1 summarizes morphological characters of *Ariadna* (including *Citharoceps*) and *Segestria*. This summary is based on examination of all the New World species of *Ariadna*, and four species of *Segestria*—*S. florentina*, *S. pacifica*, *S. ruficeps*, and *S. senoculata*. A few specimens of various Old World *Ariadna* and unidentified species of *Segestria* were also examined briefly. The characters cited show a high degree of constancy within each taxon.

Genus *Ariadna* Audouin

Ariadna Audouin, 1825, Explication Sommaire des Planches, in Savigny, Description de l'Égypte, p. 109. Type species by monotypy: *Ariadna insidiatrix* Audouin, *op. cit.*, from Alexandria, [Egypt].

Pylarus Hentz, 1827, J. Boston Soc. Nat. Hist., 4:225. Type species by present designation *Pylarus bicolor* Hentz, *ibid.*, from northern Alabama.

Macedonia Hogg, 1900, Proc. Roy. Soc. Victoria, 13:85. Type species by monotypy: *Macedonia burchelli* Hogg, *ibid.*, from Victoria.

Citharoceps Chamberlin, 1924, Proc. California Acad. Sci., ser. 4, 12:607. Type species by original designation and monotypy: *Citharoceps fidicina* Chamberlin, *ibid.*, from Ensenada, Baja California. NEW SYNONYMY.

Segestriella Purcell, 1904, Trans. South African Phil. Soc., 15(3):165. Type species by monotypy: *Segestriella gryllotalpa* Purcell, *ibid.*, from Stompneus, St. Helena Bay, Malmesbury Div., South Africa. NEW SYNONYMY.

Description. Eyes: Six in number, the anterior medians missing. Posterior row of four eyes straight or slightly recurved. Anterior row of two narrower than posterior row. Lateral eyes of each side contiguous. Median eyes contiguous or very narrowly separated. The eyes are thus arranged in three closely spaced diads.

Carapace subrectangular, rounded posteriorly, squarish anteriorly, slightly narrowed at about middle of cephalic region. Head only slightly elevated, thoracic region shallowly depressed laterad of head. Margin of carapace horizontally flanged or slightly upturned, producing a thin, dark marginal line.

Labium one and a half to two times as long as wide, sub-rectangular or sub-hexagonal, distally truncate and usually shallowly notched.

Endites spatulate, medial distal margins (anterior to labium) parallel, tips reaching fang, total length about 1.5 that of labium.

Chelicerae short and moderately tapered. The short fangs are only slightly curved. Anterior cheliceral margin armed with three tiny conical black teeth, the posterior margin with one. The number of cheliceral teeth is probably as constant as a meristic character can be. Of 200 chelicerae examined in one species, one had two teeth on the posterior margin instead of the usual one; there was no other variation. Anteriorly one of 200 had four teeth, and eight of 200 had two teeth. A few of the latter cases were probably ascribable to injury before or damage after collecting.

TABLE I. STRUCTURAL CHARACTERS OF THE SEGESTRIINAE

	<i>Ariadna</i>	<i>Segestria</i>
Cheliceral teeth	Three anterior, one posterior, all tiny and conical.	Three anterior, two posterior, all triangular.
Labium shape	Short and wide, narrowed at each end. Greatest width near base.	Long and narrow, nearly parallel-side d. Greatest width near middle.
Spination (females)	Tibiae and metatarsi of first two pairs of legs with two ventral rows of heavy spines, mostly of short to medium length and flattened. Fourth legs with few spines.	Tibiae and metatarsi of first two pairs of legs with two ventral rows of long, slender, nearly round spines. Total number of metatarsal spines on these legs much smaller than in <i>Ariadna</i> . Fourth legs with many spines.
Legs and palps	Relatively short and stout.	Relatively long and slender.
Male palpus	Tarsus short, of nearly uniform width throughout its length, notched at tip. Bulb inserted at middle of tarsal length. Palpus similar to that of <i>Loxosceles</i> .	Tarsus long, the distal two-thirds much narrower than the basal third, not notched at tip. Bulb inserted over most of the basal third of tarsus. Palpus similar to that of <i>Scytodes</i> .
Abdominal pattern	Usually lacking. When present, consisting of transverse bars on a contrasting background. Venter unmarked.	Usually present, some species with a self-colored abdomen. Pattern consisting of a median dorsal longitudinal row of dark lozenges on a light background, plus many scattered small dark spots dorsally and ventrally.

Exposed portion of labrum white, bluntly rounded at tip, reaching to the ends of the endites.

Sternum ovate to sub-rectangular, truncate anteriorly, bearing a narrow pointed articular process opposite the middle of each coxa.

Abdomen longer than wide, usually considerably so, overhanging posterior part of carapace, extending slightly beyond base of spinnerets and anal tubercle, sub-cylindrical.

Palps short and stout, bearing in females and immatures a pair of spines ventral to the claw, and prolateral spines on tarsus, tibia, and sometimes patella.

Legs relatively short and stout in females, long in males. Order of length 1-2-4-3, or occasionally in some individuals 2-1-4-3, the first and second legs always nearly equal in length. Tarsi obliquely truncate, the pretarsus, bearing the claws, set on the upper surface of the

truncation. Superior claws pectinate in a single row, inferior claw short, with a single tiny tooth.

Palp of male with tarsus short and elliptical, bulb pyriform, inserted at middle of length of tarsus. Embolus a simple spine variously curved, usually rather well set off from the bulb.

Female genital area marked only by shiny brown cuticle externally. Internally, a tiny median sclerotized structure probably represents the seminal receptacle. A large membranous sac, corresponding to the bursa copulatrix of plectreurids and dysderines, extends a short distance anterior and far posterior to the epigastric groove. The seminal receptacle has a posterior opening in its somewhat triangular base. From the opening, a short folded blind tube extends forward. A short, curved, pointed tube extends anterodorsally from the base of the receptacle, also ending blindly. The size of this receptacle

alone suggests that it does not actually function as a storage place for sperm. In several mature females, dissection revealed a yellowish white mass in the posterior part of the bursa copulatrix. Probably this mass was sperm. In a discussion of the female genitalia of *Dysdera crocata*, Cooke (1966) stated: ". . . spermatozoa are transferred, not directly to the 'spermatheca' but into the bursa . . . The small proportion of spermatozoa that get into the 'spermatheca' makes it unlikely that the true function of this structure is sperm storage." The female genitalia of haplogyne spiders are in need of further study with a view to elucidating the origin and evolution of the complex epigyna of higher spiders.

Size. Total length varies from 4.0 to 16.0 mm in mature members of the genus, carapace length from 2.1 to 7.7 mm. Leg proportions are rather uniform in most of the American species. Leg I is usually longest, but leg II sometimes exceeds it. The difference between the two rarely exceeds one millimeter and is usually much less.

In females the first leg is about 2.5 times the length of the carapace, leg II very slightly shorter, leg III less than and leg IV slightly more than twice the carapace length. The longer-legged males have leg I about 3.5 times the carapace length, leg II about three and a quarter, leg III about two and three-quarters, and leg IV about two and one-third times the carapace length.

Coloration. Color in the genus *Ariadna* is generally dull, ranging from yellowish through reddish orange and mahogany to a deep brown that appears black to the naked eye. The extent of tanning of the cuticle is probably the chief determiner of color of the carapace and appendages. In only a few species does the abdomen bear a distinct color pattern. When present, the pattern ordinarily consists of transverse bars of yellowish on a purplish gray background. By extension of the area of yellow-

ish, the pattern may come to be one of dark bars on a light background. The color pattern in *Ariadna* is never a median longitudinal series of dark lozenges, as is the rule in *Segestria*. The anterior legs are usually of about the same color as the carapace. The other legs become progressively lighter in color posteriad.

Spination. The tarsi, trochanters, and coxae of all legs lack spines in both sexes of *Ariadna*. In only a few species are there patellar spines. The tibiae and metatarsi, especially the first two pairs, bear many spines. Most obvious of these are the two ventral rows of enlarged, flattened, forward-pointing spines. Femora also bear spines, on the dorsal and prolateral surfaces only.

KEY TO AMERICAN SPECIES OF *ARIADNA*

Males

- 1a. First metatarsus armed with one or two strong apophyses, or with short thick spines set on low protuberances; metatarsus in dorsal view usually sinuous or strongly bent inward near base (nearly straight in *A. peruviana*). (Figs. 32-33, 39). ----- 2
- 1b. First metatarsus without strong apophyses or short thick spines; in dorsal view either straight or slender and sinuous. (Figs. 21, 51). ----- 6
- 2a. First metatarsus without lateral or ventral apophyses, with two or more short heavy spines arising from low protuberances (apophyses never bear heavy spines distally); metatarsus sinuous or nearly straight. (Figs. 32, 39). ----- 3
- 2b. First metatarsus with one or two large lateral or ventral apophyses, without short heavy spines; metatarsus curved or strongly bent inward at base. (Fig. 38). 4
- 3a. Heavy spines ventrolateral, opposite each other, one pair just distal to middle of metatarsus, usually a second pair at distal end of metatarsus. (Figs. 8, 26-27, 32). Caribbean from Curaçao to Florida Keys ----- *arthuri*
- 3b. Heavy spines lateral, not opposite each other, a single pair placed proximal to middle of metatarsus. (Figs. 34-35, 39). Peru. ----- *peruviana*
- 4a. With a single ventral apophysis which bears an unenlarged distal spine (this

- spine is easily broken off). (Figs. 7, 28–29, 33). Amazon Basin *gracilis*
- 4b. With a pair of lateral apophyses which do not bear distal spines 5
- 5a. The prolateral apophysis slightly but distinctly proximal to middle of metatarsus, the retrolateral apophysis more proximal; middle pair of ventral spines inserted distal to the apophysis (rarely, the prolateral spine is at the base of the prolateral apophysis); transverse diameter of palpal bulb less than twice the maximum width of palpal tibia. (Figs. 38, 42–43). Southern Canada; Maine to Florida, southern California, and northwestern Mexico. *bicolor*
- 5b. The prolateral apophysis distal to middle of metatarsus, retrolateral apophysis about at middle; middle pair of ventral spines inserted at bases of apophyses; transverse diameter of palpal bulb twice or more the maximum width of palpal tibia. (Figs. 20, 31, 36–37, 40–41). Arizona and Mexico. *pilifera*
- 6a. Metatarsus I straight in dorsal view 7
- 6b. Metatarsus I slender and sinuous in dorsal view. 10
- 7a. Abdomen with a distinct dorsal pattern of transverse bars. 8
- 7b. Abdomen unicolored, or with color marking a broad longitudinal stripe. 9
- 8a. Patellae of legs I and II each with a prolateral spine; metatarsal comb of leg IV with five to eight spines; midpiece of palp short, about equal to embolic portion in length. (Figs. 1, 16, 17, 22). Southeastern Brazil to Argentina. --- *mollis*
- 8b. Patellae of legs I and II without spines; metatarsal comb of leg IV with four spines; midpiece of palp long, much longer than embolic portion. (Figs. 3, 46–48). Uruguay and Argentina. *boesenbergii*
- 9a. Metatarsi I and II without spines (Figs. 50, 53, 56). Revilla Gigedo Islands (Mexico). *weaveri*
- 9b. Metatarsi I and II with spines. (Figs. 2, 18–19, 21). Chile, including Juan Fernandez Islands. *maxima*
- 10a. Embolic portion of palp much longer than midpiece, equal to or exceeding diameter of bulb; midpiece and embolic portion forming about a ninety degree angle with each other. (Fig. 55). 11
- 10b. Embolic portion of palp equal to or much shorter than midpiece, shorter than diameter of bulb; midpiece and embolic portion forming a relatively shallow angle with each other. (Figs. 44–45, 49). Colombia and Ecuador. *caerulea*
- 11a. Without dorsal spines on femora I and II. (Figs. 23–25, 30). Central America. *isthmica*
- 11b. With dorsal spines on femora I and II. (Figs. 51–52, 54–55). Bolivia and southeastern Brazil. *boliviana*
- Females
- 1a. Dorsal spines absent from femora I and II in 80% or more of individuals, remaining 20% usually with only one spine on each of these femora (rarely two or three spines). 2
- 1b. Dorsal spines present on femora I and II in 90% or more of individuals, usually four or more spines on each first femur, and two or more on each second femur. ... 10
- 2a. Comb of metatarsus IV with two or three spines; ventral tibial spines 4–4 on leg I, 4–1 or 4–2 on leg II. 3
- 2b. Comb of metatarsus IV with four or more spines; ventral tibial spines of leg I 4–4 or more, of leg II various combinations from 4–0 to 5–7. 5
- 3a. Comb of metatarsus IV with two spines; Patos Island and Cedros Island, upper Gulf of California, and coast of Sonora. *pragmatica*
- 3b. Comb of metatarsus IV with three spines. 4
- 4a. Metatarsus III with one inner ventral spine (95%); third tibia with no prolateral spines (90%); posterior median eyes (PME) averaging 1.1 times their diameter from posterior lateral eyes (PLE). United States and northwestern Mexico. *bicolor*
- 4b. Metatarsus III with two inner ventral spines (78%); third tibia with one or two prolateral spines (70%); PME averaging 1.6 times their diameter from PLE. Revilla Gigedo Islands, Mexico. --- *weaveri*
- 5a. Ventral spines of tibia II 4–4 or more. ... 6
- 5b. Ventral spines of tibia II fewer than 4–4. 9
- 6a. Ventral spines of tibiae I and II usually five to seven in each row; comb of metatarsus IV usually with five spines, sometimes with four; tarsi and metatarsi short; anterior legs with purplish gray annuli. Venezuela. *tubicola*
- 6b. Ventral spines of tibiae I and II usually four in each row; comb of metatarsus IV with four spines; tarsi and metatarsi of normal length; legs without annuli. ... 7
- 7a. With prolateral and retrolateral spines on tibiae I and II. Central America. --- *isthmica*

- 7b. Without lateral spines on tibiae I and II (except occasionally on retrolateral surface of tibia I in *cephalotes*). 8
- 8a. Abdomen with a dorsal pattern of transverse bars on a contrasting background. Uruguay and Argentina. *boesenbergii*
- 8b. Abdomen unicolored dorsally. Colombia and Ecuador. *cephalotes*
- 9a. With stridulating grooves on sides of cephalic region; abdomen occasionally with dorsal pattern of light bars on a dark background. California and Baja California. (Fig. 10). *fidicina*
- 9b. Without stridulating grooves on cephalic region; abdomen purplish gray. Colombia, Ecuador, and Peru. *cephalotes*
- 10a. With either two spines in the comb of metatarsus IV OR two to three prolateral spines on femur I. (Fig. 7). 11
- 10b. With more than two spines in the comb of metatarsus IV AND only one prolateral spine on femur I. 16
- 11a. Comb of metatarsus IV with four spines; femur I with two or three prolateral spines. 12
- 11b. Comb of metatarsus IV with two spines; femur I with one prolateral spine. 13
- 12a. With lateral spines on tibiae I and II; ventral spines of tibiae I and II five to eight in each row. Amazon Basin of Brazil and Peru. *gracilis*
- 12b. Without lateral spines on tibiae I and II; ventral spines of tibiae I and II seven to eleven in each row. Hispaniola. *multispinosa*
- 13a. Ventral spines of tibiae I and II four or fewer in each row. 14
- 13b. Ventral spines of tibiae I and II five or more in each row. 15
- 14a. Palpal patella spineless; femur IV with one to three dorsal spines near base. Chinchas Islands off Peru. *murphyi*
- 14b. Palpal patella with one spine; femur IV without dorsal spines. Eastern Brazil. *obscura*
- 15a. Tibiae I and II each with one to two retrolateral spines; carapace length 2.0–3.5 mm. Florida and West Indies. ... *arthuri*
- 15b. Tibiae I with three retrolateral spines each, tibiae II with none; carapace length 3.7–4.8 mm (see text). Galapagos Islands. *tarsalis*
- 16a. Tibia II with one to three spines in inner ventral row (100%). 17
- 16b. Tibia II with four spines in inner ventral row (95%). 20
- 17a. Dorsum of abdomen with a conspicuous pattern of transverse bars on a contrasting background; comb of metatarsus IV with five to eight spines. Southeastern Brazil to Argentina. *mollis*
- 17b. Dorsum of abdomen without such a pattern, usually unicolored; comb of metatarsus IV with three to four spines. 18
- 18a. Metatarsi II and III usually each bearing a retrolateral spine; total number of spines on metatarsus III 10–11. Bolivia and Brazil. *boliviana*
- 18b. Metatarsi II and III spineless retrolaterally; total number of spines on metatarsus III five to nine. 19
- 19a. Palpal patella without spines (90%). Southwestern United States and Mexico. *pilifera*
- 19b. Palpal patella with one spine (83%). Venezuela. *tovarensis*
- 20a. Palpal patella without spines (100%). 21
- 20b. Palpal patella with one to three spines (95%). 22
- 21a. Comb of metatarsus IV with three spines (75%); femur IV usually with one to four dorsal spines. Peru. *peruviana*
- 21b. Comb of metatarsus IV with four spines (75%); femur IV without dorsal spines. Colombia and Ecuador. *caerulea*
- 22a. Carapace length 4.2–7.7 mm, mean of 78 specimens 5.97 mm. Chile, including Juan Fernandez Islands. *maxima*
- 22b. Carapace length 4.2 mm (single immature specimen). St. Vincent Island, West Indies. *solitaria*

SPECIES DESCRIPTIONS

Ariadna bicolor (Hentz)

Figures 38, 42–43. Map 1.

Pylarus bicolor Hentz, 1827, J. Boston Soc. Nat. Hist., 4:225, pl. 2, figs. 3, 4, ♀, ♂. Type specimens from northern Alabama, lost.

Pylarus pumilus Hentz, 1827, *ibid.*, 4:226, pl. 2, fig. 5, juvenile. Type specimens from North Carolina and northern Alabama, lost.

Ariadna pallida C. L. Koch, 1843, Die Arachniden, 10:90, pl. 350, fig. 817, ♀. Female holotype from Pennsylvania, not seen.

Ariadne rubella Keyserling, 1877, Verhandl. der könig. kais. Zool. Bot. Gesell., Wien, 1877:229. Female holotype from Louisiana, New Orleans, in British Museum (Natural History), examined.

A. pennsylvanica: Simon, 1891, Proc. Zool. Soc. London, p. 556, nomen nudum. Simon attributed this name to C. L. Koch, so *A. pallida*, from Pennsylvania, is evidently the species he intended to refer to.

Ariadne mexicana Banks, 1898, Proc. California Acad. Sci., ser. 3, Zoology, 1(7):212. Syntypes from La Chuparosa, Baja California. One in



Map 1

California Acad. Sci. Collection, destroyed. The other in the Museum of Comparative Zoology, examined. NEW SYNONYMY.

Ariadna philosopha Chamberlin, 1924, Proc. California Acad. Sci., ser. 4, Zoology, 12(28):606. Female holotype from Isla Partida, Gulf of California, in California Acad. Sci. Collection, examined. NEW SYNONYMY.

Discussion. Although no types of either of Hentz's species exist, the name *A. bicolor* may be assigned with certainty to this species. Specimens from both North Carolina and northern Alabama are available, and are identical with the nearly continent-wide species to which the name *A. bicolor* has been applied for over 100 years. Other species of *Ariadna* are of very limited distribution in the United States: *A. arthuri* in the southern part of peninsular Florida and the Keys, *A. pilifera* in southern Arizona, and *A. fidicina* in the southern half of California west of the mountains.

In spite of Hentz's denial of this fact, his *Pylarus pumilus*, described in half a dozen lines, can be nothing but the juvenile of *A. bicolor*, as suggested by Emerton (1875). Koch's description of *A. pallida* contains nothing distinctive of any particular species of the genus. A large series of specimens from Pennsylvania, the type locality of *A. pallida*, differs in no significant way from other populations assigned to *A. bicolor*.

Ariadne rubella Keyserling, from New Orleans, differs only by its reddish color, according to the description. Some Louisiana specimens are distinctly more reddish than most *A. bicolor*, but are otherwise indistinguishable. In the absence of freshly collected specimens from Louisiana, it is not even certain that the reddish color is natural.

Banks's *A. mexicana* was supposedly distinguishable from *A. bicolor* by its more

slender build and smaller eyes. The former difference does not exist. The eyes are smaller, leaving a much wider space between the posterior median and posterior lateral eyes than in *U. S.* specimens of *bicolor*, from which *mexicana* does not otherwise differ. This may be a geographic variation, but so few Mexican specimens are available that I do not feel justified in recognizing it even as a subspecies.

Chamberlin's *A. philosopha* from Isla Partida in the Gulf of California has small eyes also. It also occasionally has a pro-lateral spine on the second tibia, which is extremely rare in *A. bicolor* from other areas. Other differences are well within the range of individual variation of *bicolor*. The spine characters which supposedly distinguish *philosopha* from *mexicana* are much too variable to be so used. *Ariadna bicolor* is so remarkably uniform in most characters throughout the United States that, with additional material, it may become desirable to recognize a subspecies for the Mexican specimens.

Color. Female. Described from a freshly collected specimen from Gibraltar Island, Ottawa County, Ohio. Carapace mahogany, darker in head region. Abdomen purplish gray above and below, with a satiny luster, sometimes slightly iridescent, finely striate with yellow lines. Striations longitudinal on sides of abdomen, transverse ventrally and mid-dorsally. A narrow yellowish lateral line on each side of abdomen, ending at the upper surface of the anal tubercle.

First legs brown to very dark brown, sometimes with an olive green tinge, especially soon after molting. The other legs progressively paler posteriad, the fourth pair light mahogany or dark yellow-brown. Chelicerae very dark brown, almost black. Palps brown proximally, darker distally.

Labium and endites brown, endites with white tips, labrum white. Sternum bright mahogany, margins darker. Spinnerets whitish, with pale brown transverse mark-

ings. Anal tubercle whitish. Epigastric plates yellowish, ventral surface of pedicel white or translucent. Genital area in the shape of a low wide triangle, slightly swollen, the cuticle brown and shining.

Male. Overall pattern as in the female, but generally paler, the legs and carapace yellowish to medium brown in most cases.

Structure. Dimensions of 80 females: total length 6.1–15.0 mm, mean 8.73 mm; carapace length 3.0–4.8 mm, mean 3.84 mm; carapace width 1.9–3.1 mm, mean 2.40 mm; sternum length 1.7–3.8 mm, mean 2.20 mm; sternum width 1.1–1.6 mm, mean 1.31 mm.

Dimensions of 22 males from a single locality: total length 5.4–7.2 mm, mean 6.15 mm; carapace length 2.7–3.4 mm, mean 2.96 mm; carapace width 1.9–2.4 mm, mean 2.04 mm; sternum length 1.5–2.0 mm, mean 1.75 mm; carapace width 0.9–1.2 mm, mean 1.04 mm. No other collection of males contains more than one to a few specimens. Some of these, however, are larger than any specimen included in the above sample.

Spination. See Table 4.

Diagnosis. The comb of three spines on the fourth metatarsus distinguishes *A. bicolor* from all other New World *Ariadna* except *A. peruviana*, *A. weaveri*, and some specimens of *A. pilifera*. Females may be distinguished from *peruviana* by having only two, instead of four spines in the inner ventral row on tibia II, and from *pilifera* by the absence of lateral spines on the first two tibiae. Females of *weaveri* are quite similar to those of *bicolor*, but are readily distinguished by distribution, and by the characters given in the key. The pair of large lateral apophyses on the first metatarsus of the male *bicolor* separates it from all other known males except that of *pilifera*. The apophyses of *pilifera* are more distal, and the palpal bulb proportionately larger than in *bicolor*.

Distribution. Maine to Florida and west to southern California, Baja California, and northwestern Mexico. Specimens are not

available, however, from large parts of the central plains and the Northwest. The only Canadian records are from two islands in western Lake Erie.

Records. County records only are given for the United States.

CANADA. ONTARIO: Big Chicken Island, Lake Erie, under boards and stones; East Sister Island, Lake Erie, under boards and stones.

UNITED STATES. ALABAMA: *Colbert, Jackson, Madison, Marshall.* ARIZONA: *Coconino.* ARKANSAS: *Benton, Washington.* CALIFORNIA: *San Diego.* COLORADO: *Chaffee, El Paso, Fremont.* CONNECTICUT: *Fairfield, New Haven.* DISTRICT OF COLUMBIA. FLORIDA: *Alachua, Gadsden, Hernando, Highlands, Indian River, Jackson, Lake, Levy, Liberty, Marion, Nassau, Orange, St. Johns.* GEORGIA: *Floyd, Fulton.* ILLINOIS: *Bond, Jackson, Macoupin, Union, Williamson.* INDIANA: *Brown, Crawford, Owen.* KENTUCKY: *Carter, Harding, Madison, Wolfe.* LOUISIANA: *Beauregard, Caddo, East Baton Rouge, Grant, Jefferson, Madison, Orleans, St. Charles.* MAINE: *Knox.* MARYLAND: *Montgomery, Prince Georges.* MASSACHUSETTS: *Barnstable, Essex, Middlesex, Norfolk, Plymouth.* MISSISSIPPI: *George, Hinds, Jackson, Oktibbeha.* MISSOURI: *Boone, St. Louis, Taney, Wayne.* NEW JERSEY: *Cape May, Mercer, Ocean.* NEW MEXICO: county unknown. NEW YORK: *Albany, Bronx, Nassau, Orange, Rockland, Suffolk.* NORTH CAROLINA: *Carteret, Durham, Guilford, Transylvania, Wake.* OHIO: *Ashland, Cuyahoga, Hocking, Mercer, Ottawa, Wayne.* OKLAHOMA: *Comanche.* PENNSYLVANIA: *Blair, Bucks, Franklin.* TENNESSEE: county unknown. TEXAS: *Bastrop, Brazos, Cameron, Comal, Denton, Hays, Kerr, McLennan, Travis, Walker.* VIRGINIA: *Fairfax, Montgomery, Page.* WEST VIRGINIA: *Hancock.*

MEXICO. Isla Partida, Gulf of California, ♀^{oo}, holotype and paratypes of *A. philosopha*. Santa Catalina Island.

Ariadna pilifera O. P.-Cambridge

Figures 20, 31, 36–37, 40–41. Map 1.

Ariadne pilifera O. P.-Cambridge, 1898, Biol.-Cent. Amer., Arach. 1:235, plate 30, figure 9, 9 a-c, ♀. Female holotype from Mexico, Durango, in British Museum (Natural History), examined.

Ariadne comata O. P.-Cambridge, 1898, Biol.-Cent.-Amer., Arach., 1:235, plate 30, figure 8, 8a-c, ♀. Female holotype from Mexico, Orizaba, in British Museum (Natural History), examined. NEW SYNONYMY.

Ariadna acanthopus Simon, 1907, Ann. Soc. Ent. Belg., 51:263, figure 5, ♂. Male holotype from Mexico, Guanajuato, in Muséum National d'Histoire Naturelle, Paris, examined. Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):730. NEW SYNONYMY.

Ariadna jaliscoensis Chamberlin, 1925, Bull. Mus. Comp. Zool., 68(4):212. Female holotype from Mexico, Hacienda San Marcos, SW Jalisco, in Museum of Comparative Zoology, Cambridge, examined. Bonnet, 1955, Biblio. Aran., 2(1):733. NEW SYNONYMY.

Ariadna pilifera: F. O. P.-Cambridge, 1899, Biol.-Cent.-Amer., Arach., 2:43; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):732.

Ariadna comata: F. O. P.-Cambridge, 1899, Biol.-Cent.-Amer., Arach., 2:43; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 21:131; Bonnet, 1955, Biblio. Aran., 2(1):732.

Not *Ariadna comata*: Banks, 1929, Bull. Mus. Comp. Zool., 69(3):54.

Discussion. This species is much more variable in some normally stable characters than any other American *Ariadna*. For a time it was believed that the specimens on hand might belong to as many as five species. The distributions of these apparent species made no sense, however. With long series of specimens from each of several scattered localities, the variability of the species became evident. This variation is especially pronounced in the population found near Portal, Arizona.

Types of all the species listed in the synonymy above have been examined. The holotype of *A. acanthopus* is a male, the other three are females. Chamberlin's *A. jaliscoensis* differs most from the modal values for characters of other specimens assigned to *pilifera*. In its most divergent

characters, however, the *jaliscoensis* holotype is usually still within the range of variation of other *pilifera* specimens. Only one character, the number of spines on the palpal tarsus, is entirely non-overlapping.

The name *Ariadna comata* was first applied to Central American specimens by Banks (1929), presumably because *comata* was the southernmost species recorded from Mexico. The type of *comata*, when examined, proved to be similar to that of *pilifera*, and quite different from the Central American form. The latter is described herein as a new species.

Color. Male. Carapace dark reddish mahogany. Anterior legs a little lighter, remaining legs yellowish brown. Bulb of palp yellow. Remainder of palp, endites, labium, and coxae yellowish brown, sternum darker. Abdomen purplish gray above and below. Spinnerets and anal tubercle brownish yellow.

Female. Darker than male, the carapace and all legs deep mahogany, becoming almost black on distal podomeres of first leg. Underside of cephalothorax and legs scarcely lighter than upper side.

Structure. Dimensions of eight males: Total length 7.2–10.6 mm, mean 9.15 mm; carapace length 3.8–5.0 mm, mean 4.36 mm; carapace width 2.5–3.1 mm, mean 2.76 mm; sternum length 2.3–3.1 mm, mean 2.74 mm; sternum width 1.30–1.63 mm, mean 1.502 mm.

Dimensions of thirty females: Total length 9.7–15.0 mm, mean 12.02 mm; carapace length 4.9–6.4 mm, mean 5.72 mm; carapace width 2.7–3.9 mm, mean 3.35 mm; sternum length 2.9–3.9 mm, mean 3.33 mm; sternum width 1.55–2.37 mm, mean 1.896 mm.

Male palp. Bulb large, tibia not inflated, the bulb 2.5 times the width of the tibia. Midpiece quite short and conical, embolic portion and midpiece together shorter than maximum depth of bulb. Embolic portion shallowly curved near distal end.

Male first leg. Metatarsus strongly bent inward, bearing a large, acute retrolateral apophysis just proximal of the middle and a smaller prolateral one just distal of the middle. Tibia with two to three of the outer ventral spines modified.

Investiture. Male. Hair covering of abdomen rather short. Tarsi of all legs scopulate, metatarsi sometimes with a very short distal scopulate area.

Female. Clothed throughout with conspicuous long hair, normal in pattern of arrangement, but somewhat denser and longer than usual. Color of the hair varies from reddish or brown to black.

Spination. See Table 17.

Diagnosis. The variation in this species makes diagnosis or placement in a key somewhat difficult. The male is closely similar to that of *A. bicolor*. Only in these two species is the first metatarsus stout, strongly bent, and provided with a lateral apophysis on each side. The more distal placement of the apophyses and the proportionately larger palpal bulb distinguish the male of *pilifera* from that of *bicolor*.

In the female of *pilifera*, lateral spines are present on tibiae I and II, separating the species from *bicolor*, which it generally resembles. The ventral spination of tibia II is normally 4–(1–2), and the metatarsal comb usually contains 3–4 spines (three in most populations examined); retrolateral spines are absent from metatarsi II and III and tibia III; metatarsi I and II usually have 7–10 spines in each ventral row, and metatarsus IV usually has 1–2 spines in addition to the comb.

Distribution. Southern Arizona to the Isthmus of Tehuantepec in southern Mexico.

Records. ARIZONA: *Cochise Co.*, Chiricahua Mtns., Portal and Southwestern Research Station, Chiricahua National Monument; *Huachuca Mtns.*, Carr, Ramsey, and Miller Canyons. *Graham Co.*, Mt. Graham near Safford. *Navajo Co.*, 12 mi. S of Show-low. *Pima Co.*, Ajo Mtns.,

Organpipe Cactus National Monument, Alamo Canyon. Baboquivari Mtns., Brown Canyon, and Forestry Cabin; Santa Catalina Mtns., lower Sabino Canyon, Molino Basin, Peppersauce Canyon, Windy Point, Geology Vista, San Pedro Vista; Santa Rita Mtns., Madera Canyon, Roundup Camp.

MEXICO. CHIHUAHUA: Primavera, 5500–6000 ft. COLIMA: 12 mi. E of Manzanillo. DURANGO: Ojo de los Encinos. GUANAJUATO: no further data, o. GUERRERO: Ayotzinapa. HIDALGO: Jacala, Rancho Viejo near Jacala. MICHOACÁN: Jiquilpan, Morelia, Tancitaro, 6500 ft. MORELOS: Cuernavaca, 3 mi. E of Cuernavaca, 9.6 mi. E of Cuernavaca. NAYARIT: Campostela. OAXACA: 67 mi. NW of Tehuantepec. PUEBLA: Tehuacan. SAN LUIS POTOSÍ: Tamazunchale, 3.8 mi. W of El Naranjo (Veracruz), E of Ciudad del Maíz. TAMAULIPAS: 5 mi. W of Altamira. VERACRUZ: Acultzingo, W of Orizaba, 15 mi. NW of Jalapa.

Ariadna pragmatica Chamberlin

Map 1.

Ariadna pragmatica Chamberlin, 1924, Proc. California Acad. Sci., ser. 4, 12(28):606. Female holotype from Mexico, Sonora, Tepoca Bay, in California Academy of Science, examined. Bonnet, 1955, Biblio. Aran., 2(1):736.

Ariadna scholastica Chamberlin, 1924, Proc. California Acad. Sci., ser. 4, 12(28):607. Female holotype from Gulf of California, Patos Island, in California Academy of Science, examined. Bonnet, 1955, Biblio. Aran., 2(1):737. NEW SYNONYMY.

Discussion. Chamberlin separated his two species, *scholastica* and *pragmatica*, on the basis of the spacing of the posterior eyes. Only three specimens are available. In these the distance from PME to PLE is, respectively, 1.125, 1.667, and 1.882 times the diameter of a PME. This is a little more than the range of variation in *A. bicolor* (80 specimens). In other respects the specimens are quite similar. Recalling the variation of eye spacing shown by *A. philospha* (= *A. bicolor*) in the same

geographic region, it seems best to unite *A. scholastica* and *A. pragmatica* also.

The treatment of all of Chamberlin's species from the islands and shores of the Gulf of California has been difficult. The type localities are difficult of access, only a handful of specimens (some of which have been dried) are in collections, and the extreme climatic conditions of the region are seemingly operating on the animals to produce variation not usual in the genus. The presence of any *Ariadna* at all in such a hot arid region as coastal Sonora is surprising. More specimens are needed, but they may be difficult to find.

Color. Carapace and chelicerae orange-brown. Anterior legs yellow-brown, darker distally. Succeeding legs lightening to yellow. Sternum, endites, and labium yellow-brown to orange-brown, coxae yellow-brown to yellow. Abdomen purplish gray above, yellowish beneath.

Structure. Dimensions of three females: Total length 8.6–12.3 mm, mean 10.33 mm; carapace length 3.9–4.6 mm, mean 4.31 mm; carapace width 2.2–4.1 mm, mean 3.03 mm; sternum length 2.2–4.0 mm, mean 2.94 mm, sternum width 1.33–2.57 mm, mean 1.823 mm.

Investiture. Generally normal. The fringe on anterior legs is less conspicuous than usual.

Spination. See Table 18.

Diagnosis. Only the female is known. The absence of lateral spines from tibiae I and II, and the presence of only two spines in the metatarsal comb separate *A. scholastica* from the other American species.

Distribution. Shore and islands of the Gulf of California.

Records. MEXICO. SONORA: Tepoca Bay, 25 Apr. 1921, ♀, (J. C. Chamberlin), holotype of *A. pragmatica*. GULF OF CALIFORNIA: Patos Island, 23 Apr. 1921, ♀, (J. C. Chamberlin), type of *A. scholastica*; Cedros Island, 22 Feb. 1945, ♀, (B. F. Osorio Tafall).

Ariadna weaveri sp. n.

Figures 50, 53, 56. Map 1.

Holotype. A male from Mexico, Islas Revilla Gigedo, Clarion Island, in American Museum of Natural History. The species is named after my good friend and former professor, Dr. Andrew A. Weaver, who first introduced me to the study of spiders.

Discussion. The sexual dimorphism in this species is much greater than is usual in *Ariadna*. The total body length of the males is only equal to or slightly more than the carapace length of some of the females. The male coloration is lighter than usual in relation to that of the females.

Color. Male. Carapace orange-brown, narrowly flanged marginally, producing a thin dark marginal line in dorsal view. First legs slightly brownish yellow, remaining legs yellow to yellowish white. Chelicerae yellow, endites and labium yellowish white. Sternum yellow suffused with purplish gray. Abdomen yellow suffused with purplish gray laterally and on the lateral parts of dorsum and venter. Dorsum with a broad median band of purplish gray finely mottled with yellowish, the band broadening posteriorly to the full width of the abdomen. Venter with a broad median band of clear yellowish white, the band narrowing posteriorly. Fine transverse yellowish lines break the dorsal band of the abdomen into sections that probably correspond with the (otherwise externally suppressed) segmentation of the abdomen. Seven of these sections are visible in the posterior third of the abdomen anterior to the anal tubercle.

Female. Carapace, chelicerae, palps, and first legs distal to femur mahogany. The first femur and the remaining legs yellow to yellow-brown. Sternum, labium, and endites light mahogany. Abdomen uniform purplish gray above and below in some specimens, yellowish beneath in others.

Structure. Dimensions of two males: Total length 4.0, 5.2 mm; carapace length

1.8, 2.1 mm; carapace width 1.3, 1.6 mm; sternum length 1.3, 1.5 mm; sternum width 0.78, 0.87 mm.

Dimensions of seven females: Total length 7.8–12.2 mm, mean 10.10 mm; carapace length 3.5–6.0 mm, mean 4.68 mm; carapace width 2.2–3.7 mm, mean 2.91 mm; sternum length 2.5–3.5 mm, mean 2.92 mm; sternum width 1.21–1.96 mm, mean 1.541 mm.

Male palp. Bulb small, its greatest diameter about equal to diameter of tibia plus tarsus, and its transverse diameter about twice the width of tibia. Midpiece very short, conical, passing into the embolic portion at a curve. Embolic portion shorter than palpal tibia and not much longer than midpiece. Another shallow bend at tip of embolus. Palpal tibia thickened somewhat at base, but not inflated.

Male first leg. Metatarsus and tarsus slender, almost straight, and entirely without spines or apophyses.

Investiture. Male. Hair very short and sparse on the carapace, tending to be arranged in rather regular longitudinal rows on the cephalic region. Elsewhere arranged as in *A. isthmica*, but lacking the scopulae of hooked hairs on tarsi and metatarsi.

Female. Hair longer and denser than in male, especially on palps and legs.

Spination. See Table 23.

Diagnosis. Male. Metatarsus I nearly straight, slender, without spines or apophyses. Metatarsal comb of three spines. Length of embolic portion of palp less than width of palpal bulb.

Female. Tibiae I and II without lateral spines; ventral spines of tibia II usually 4–2 (the outer row, however, often contains one or two additional spines); metatarsal comb of three spines; usually with 1–2 prolateral spines on tibia III. Carapace length 3.5–6.0 mm, mean 4.68 mm.

Distribution. Mexico, the Revilla Gigedo Islands.

Records. MEXICO. Clarion Island 7–8 May 1955, ♂♂ ♀♀ oo, from log. (McDonald

and Blodget); Socorro Island, 1–5 May 1955, ♀, (McDonald and Blodget).

***Ariadna caerulea* Keyserling**
Figures 44–45, 49. Map 2.

Ariadne caerulea Keyserling, 1877, Verhandl. der könig. kais. Zool. Bot. Gesell., Wien, 1877:227. Female and juvenile syntypes from Colombia, Bogotá, in British Museum (Natural History), examined.

Ariadna caerulea: Petrunkevitch 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):732.

Discussion. This species appears to be, as does *A. pilifera*, more variable in some characters than is usual. One of the six females had only three spines in the metatarsal comb, rather than four, and another had only two lateral tibial spines. It is possible that more than one species is included here but, since each of the females was collected at a different locality, nothing is known of the range of intrapopulation variation. Until more specimens become available only one, presumably variable, species should be recognized.

Color. Male and female. Carapace, anterior legs, chelicerae, and palps reddish mahogany. Legs with longitudinal lighter stripes. Posterior legs paler. Sternum, endites, and labium orange-brown. Abdomen uniform dark purplish gray above, only a little paler beneath, with a bluish surface sheen.

Structure. Dimensions of one male: total length 3.9 mm; carapace length 2.2 mm; carapace width 1.6 mm; sternum length 1.4 mm; sternum width 0.84 mm.

Dimensions of five females: total length 7.8–11.7 mm, mean 9.44 mm; carapace length 4.1–4.7 mm, mean 4.33 mm; carapace width 2.5–2.9 mm, mean 2.64 mm; sternum length 2.0–2.7 mm, mean 2.31 mm; sternum width 1.28–1.63 mm, mean 1.424 mm.

Investiture. Hair long and reddish, distributed as usual. Fringes especially long on femora and tibiae I and II.

Spination. See Table 7.

Diagnosis. Tibiae I and II with lateral

spines; tibia II with 4–(3–4) ventral spines. Metatarsus IV with a comb of four spines and usually no additional ones. Metatarsi II and III unarmed retrolaterally, III usually with a total of 5–9 spines.

Male. Metatarsus of first leg slender and straight, without apophyses or modified spines. Metatarsi I and II each with 2–4 spines. Palpal tibia conspicuously inflated, bulb of palp small, length of embolic portion about equal to width of bulb.

Distribution. Colombia and Ecuador, in mountains (Map 2).

Records. COLOMBIA. CUNDINAMARCA: Bogotá (type locality). MAGDALENA: S side of Sierra Nevada de Santa Marta, 8–11,000 ft (2440–3350 m); NARIÑO: 20 mi. E of Pasto; TOLIMA: 10 mi. W of Ibagué; VALLE: 11 mi. W of Cali; 13 mi. W of Cali.

ECUADOR. AZUAY: Lago Zurucuchu, 11 mi. W of Cuenca; PICHINCHA: 7 mi. S of Cayambe; TUNGURAHUA: Baños.

***Ariadna cephalotes* Simon**
Figure 11. Map 2.

Ariadna cephalotes Simon, 1907, Ann. Soc. Ent. Belg., 51:262. Female and juvenile syntypes from Bolivia, San Mateo, in Muséum National d'Histoire Naturelle, Paris, examined. The female specimen is here designated as the lectotype, and the juvenile as a lectoparatype. Petrunkevitch 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):732.

Ariadna hotchkissi Chamberlin, 1916, Bull. Mus. Comp. Zool., 61(3):216, Pl. 10, fig. 4, 5. Immature holotype from Lucma, Cuzco, Peru, in Museum of Comparative Zoology, Cambridge, examined. Bonnet, 1955, Biblio. Aran., 2(1):732. NEW SYNONYMY.

Discussion. Neither *A. cephalotes* nor *A. hotchkissi* has been reported in the primary literature since the original descriptions were published. No additional specimens are available from near the type localities of either. In 1965, however, Levi collected, at Tarma, Peru, a small series of *Ariadna* that agree well with the lectotype of *A. cephalotes*.

The holotype of *A. hotchkissi* is an im-



Map 2

mature specimen. It has a reduced spination as compared with the lectotype of *cephalotes*, but is quite close to the immature lectoparatype of that species. The differences in spination between the latter two specimens are in the ventral spination

of the second tibia and the metatarsal comb. Although these are normally highly diagnostic characters, they do vary enough even in single demes to be of doubtful reliability when comparing singly collected specimens with each other.

It seems better, in view of the usually extensive distributions of species in this genus, and the fact that all the specimens in question are from similar mountainous areas, to synonymize *A. hotchkissi* with *A. cephalotes*. If further collecting should demonstrate the distinctness of *A. hotchkissi*, the Peruvian specimens described below should be retained in *A. cephalotes*.

Color. Female. Carapace dark mahogany, chelicerae darker. Legs yellowish brown, anterior legs and distal segments darker. Distal segments of palp almost as dark as carapace. Metatarsi I and II with distinct dark distal annuli, fainter annuli on tibiae I and II and metatarsi III and IV. Abdomen dark purplish gray.

Male unknown.

Structure. Dimensions of eight females: total length 9.2–11.4 mm, mean 9.78 mm; carapace length 4.4–5.0 mm, mean 4.54 mm; carapace width 2.8–3.4 mm, mean 2.93 mm; sternum length 2.6–3.0 mm, mean 2.64 mm; sternum width 1.43–1.70 mm, mean 1.491 mm.

Investiture. As usual.

Spination. See Table 8.

Diagnosis. Generally lacking lateral spines on all tibiae (occasionally 1 or more retrolateral spines on tibia I), ventral spines 4–4 on tibia I, 4–3 on tibia II; abdomen uniform purplish gray.

Distribution. Bolivia and Peru.

Records. BOLIVIA. San Mateo (female lectotype, juvenile lectoparatype).

PERU. APURIMAC: 37 km S. of Andahuaylas, 6 March 1951, ♀^{oo} (E. S. Ross and A. E. Michelbacher); Cuzco: Lucma, 7000 ft (2130 m), Aug. 1911, Yale Peruvian Expedition (holotype of *A. hotchkissi*); JUNÍN: Tarma, 3100 m (10175 ft), 11–12 Feb. 1965, ♀♀, (H. W. Levi), 14 Feb. 1965, "in ground" ♀♀^{oo}, (H. W. Levi).

Ariadna murphyi (Chamberlin),
new combination

Map 3.

Dysdera murphyi Chamberlin, 1920, Brooklyn Mus. Sci. Bull., 3(2):38. Female holotype

from Peru, Chinchas Island, in Museum of Comparative Zoology, examined. Bonnet, 1956, Biblio. Aran., 2(2):1631.

Discussion. This is an ordinary member of the genus *Ariadna*, without any morphological characters more than usually suggestive of *Dysdera*. Chamberlin seems, for a brief time, to have considered *Ariadna* similar enough to *Dysdera* to warrant uniting the two genera. Later he described additional species in *Ariadna*. The correct placement of *A. murphyi* has not been made known previously. Only the female and juvenile are known.

Color. Carapace and first legs orange-brown to rich reddish mahogany. The other legs paler. Abdomen light purplish gray to grayish yellow above, scarcely paler beneath.

Structure. Dimensions of seven females: Total length 9.0–12.0 mm, mean 10.61 mm; carapace length 4.5–5.9 mm, mean 5.04 mm; carapace width 2.2–3.2 mm, mean 2.86 mm; sternum length 2.4–3.0 mm, mean 2.73 mm; sternum width 1.06–1.71 mm, mean 1.491 mm.

Investiture. Fringes of hair on anterior legs straight, rather than curling. Lateral spines on tibiae I and II very short, half the tibial diameter or less.

Spination. See table 15.

Diagnosis. The presence of only two spines in the metatarsal comb distinguishes *A. murphyi* from most other species. The ventral tibial spination, 4–4 on tibiae I and II, separates it from the other species with two-spined comb.

Distribution. Recorded only from islands off the coast of Peru (Map 3).

Records. PERU. Chinchas Island, 12 Oct. 1919, ♀♀^o, (R. C. Murphy), holotype and paratypes; South Chinchas Island, 23 Feb. 1935, ♀♀^{oo}.

Ariadna peruviana sp. n.

Figures 34–35, 39. Map 3.

Holotype. Male from Lima, Lima, Peru, 1939 (W. K. Weyrauch) in the Museum of



Map 3

Comparative Zoology. The name is an adjective referring to the country of origin of the species.

Color. Male. Carapace mahogany. Chelicerae yellowish brown. First pair of legs yellowish brown, the succeeding pairs lightening to yellow. Sternum, labium, endites, and coxae yellow-orange. Palps yellow. Abdomen yellowish white beneath and laterally, with a sooty median dorsal band about one-third the width of the abdomen anteriorly, widening to the full abdominal width posteriorly. Faint darker markings as in the female.

Female. Carapace, chelicerae, palpal tibia and tarsus, and first legs distal to the femur dark reddish mahogany. Succeeding legs lightening to yellow-brown. Labium and endites mahogany. Sternum, coxae,

palpal femur and patella yellow-brown. Abdomen purplish gray above, darker in the axial third. Inconspicuous longitudinal lines resembling short dark brush strokes are visible on the dorsum of well-preserved specimens.

In some alcoholic specimens of both sexes the abdomen is almost white except for the sooty wash down the middle. The condition of these specimens suggests that the effect of preservation is chiefly responsible for their paleness. Both the males are light-colored.

Structure. Dimensions of two males: total length 6.8, 6.8 mm; carapace length 3.5, 3.6 mm; carapace width 2.3, 2.5 mm; sternum length 2.1, 2.3 mm; sternum width 1.1, 1.1 mm.

Dimensions of six females: total length

8.3–11.3 mm, mean 9.72 mm; carapace length 3.7–5.3 mm, mean 4.42 mm; carapace width 2.3–3.4 mm, mean 2.81 mm; sternum length 2.3–3.2 mm, mean 2.72 mm; sternum width 1.2–1.8 mm, mean 1.44 mm.

Male palp. Bulb small, twice width of palpal tibia or less. Midpiece of palp much longer than the embolus and about equal to palpal tibia in length. Embolus making about one quarter of a helical turn.

Male first leg. First metatarsus moderately slender and bearing two lateral protuberances or low apophyses, each of which ends in a short thick spine. The retrolateral protuberance is near the base of the metatarsus, the prolateral one is more distal, but still in the proximal half of the metatarsus. The distal spine in the outer ventral row on tibia I is somewhat shortened and thickened.

Investiture. About as usual in both sexes.

Spination. See Table 2.

Diagnosis. Male. The heavy spines of the first metatarsus, placed in the proximal half of the podomere, and not opposite each other, are distinctive for the male of this species.

Female. Lateral spines present on tibiae I and II. Ventral spines of tibiae I and II 4–4 (the proximal inner spine is generally more slender than the others). Metatarsal comb of three spines.

Distribution. Known only from Peru (Map 3).

Records. PERU. LIMA: La Molina, 250 m; Jan. 1961, 4♀♀ (R. Garcia); Lima, 1939, in house, ♂♂♀♀oo (W. K. Weyrauch); Lima, 9 Jan. 1955, o, (E. I. Schlinger and E. S. Ross). LIBERTAD: Jequetepeque, 15 Feb. 1965, o. (L. Peña).

Ariadna maxima (Nicolet)

Figures 2, 18–19, 21. Map 2.

Dysdera maxima Nicolet, 1849, in Gay, Hist. fis. y polit. de Chile, 3:341, pl. 2, fig. 6, 6a-d, ♀. Holotype lost. Keyserling, 1877, Verhandl. der könig. kais. Zool.-Bot. Gesell. Wien, 1877:230.

Dysdera vivens Nicolet, 1849, in Gay, Hist. fis. polit. Chile, 3:342. Holotype lost. Keyserling, 1877, Verhandl. der könig. kais. Zool.-Bot. Gesell. Wien, 1877:230; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):734.

Dysdera incerta Nicolet, 1849, in Gay, Hist. fis. polit. Chile, 3:342. Holotype lost. Keyserling, 1877, Verhandl. der könig. kais. Zool.-Bot. Gesell. Wien, 1877:230; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):734.

Dysdera coarctata Nicolet, 1849, in Gay, Hist. fis. polit. Chile, 3:344, pl. 2, fig. 7, 7a-c, ♀. Holotype lost. Simon, 1864, Hist. Nat. Araignées, p. 106; Keyserling, 1877, Verhandl. der könig. kais. Zool.-Bot. Gesell. Wien, 1877:230; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1956, Biblio. Aran., 2(2):1619. NEW SYNONYMY.

Ariadna maxima: Simon, 1896, Actes Soc. Sci. Chili, 6:64; 1897, Actes Soc. Sci. Chili, 6:105, 107:1900, Rev. Chil. Hist. Nat., 4:49; 1902, Ergebn. Hamburger Magal. Sammlr., 6(4):11; 1905, Bull. Soc. Ent. Fr., 1905(4):71. F. P.-Cambridge, 1898, Journ. Linn. Soc. London, 27:17. Porter, 1914, Rev. Chil. Hist. Nat. 21(6):180; 1917, Actes Soc. Sci., Chili, 25(2):82. Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131. Berland, 1924, Nat. Hist. Juan Fern., Easter Isl., 3(3):423, 426; 1934, Publ. Soc. Biogeogr., 4:168. Bonnet, 1955, Biblio. Aran., 2(1):734.

Discussion. Four of the five species described by Nicolet were collected in the vicinity of Santiago and evidently were based upon different ages, sexes, and colorations of a single species. No types are available for any of the species. Fortunately hundreds of specimens from Chile are on hand, especially from the region of Santiago, but altogether covering most of the length of the country. All but four of the specimens belong to a single species. The fifth species described by Nicolet, *Dysdera longipes* collected in Valdivia, has also been synonymized with *maxima* (Petrunkevitch, 1911; Bonnet, 1955). Recently, however, Levi collected in Valdivia two male and two female *Ariadna* which appear to belong to two additional species. The name *longipes* is being reserved for one of these. Descriptions are deferred until more material is available.

For some reason *Dysdera coarctata* has not previously been synonymized with *maxima*, and has been listed in later works as a *Dysdera* (Porter, 1917; Bonnet, 1956). Nicolet's illustration is obviously of an *Ariadna*, and there is no more reason to regard *coarctata* as a separate species than there is for any of the other synonyms.

Color. In general like that of *A. bicolor*, but on the average darker. Male. Palps yellow-brown. Chelicerae and legs lighter in color than those of the female, mahogany to yellow-brown. Color otherwise as in the female.

Female. Carapace deep reddish mahogany, sometimes with a tinge of maroon. Chelicerae almost black. Distal palpomeres and first legs reddish mahogany, remaining legs lightening to yellowish-brown. Labium and endites chestnut. Sternum and coxae yellow-brown, the sternum darker marginally. Abdomen light to dark purplish gray above and below. Large egg-filled females are paler than those not in reproductive condition, because of the stretching of the cuticle.

Structure. Dimensions of 15 males: Total length 7.7–10.2 mm, mean 8.78 mm; carapace length 4.1–5.6 mm, mean 4.79 mm; carapace width 2.7–3.8 mm, mean 3.15 mm; sternum length 2.6–3.6 mm, mean 3.01 mm; sternum width 1.30–1.75 mm, mean 1.490 mm.

Dimensions of 76 females: Total length 8.3–16.0 mm, mean 12.70 mm; carapace length 4.2–7.7 mm, mean 5.97 mm; carapace width 2.5–4.4 mm, mean 3.42 mm; sternum length 2.5–4.5 mm, mean 3.46 mm; sternum width 1.30–2.30 mm, mean 1.723 mm.

Male palp. Bulb small, tibia moderately inflated, the width of the bulb equal to or less than tibial width. Midpiece and embolic portion together shorter than tibia. Midpiece not clearly distinguishable from the embolic portion, the latter wider than in other species.

Male first leg. Metatarsus and tarsus

straight, the metatarsus without apophyses or modified spines.

Investiture. Hair long, clothing entire body rather densely, in normal pattern. Fringes of anterior legs of female not very conspicuous.

Spination. See Table 12.

Diagnosis. Male. Metatarsus straight and not notably slender, lacking apophyses and modified spines. Metatarsal comb of four spines. Embolic portion and midpiece of palp together less than palpal tibia in length.

Female. Lateral spines present on tibiae I and II, 4–4 ventral spines on tibiae I and II; four spines in metatarsal comb, plus 1–2 other ventral spines on the same podomere; metatarsus III with 5–9 spines, none retrolateral; carapace length 4.2–7.7 mm, mean 5.97 mm.

Distribution. Chile, including Juan Fernandez Islands.

Records. CHILE. ACONCAGUA: San Felipe. ANTOFAGASTA: Tal-tal. CAUTIN: Temuco; Villarica, garden, and on buildings; NE of Villarica; 30 km NE of Villarica. COLCHAGUA: Chepica; Cuncuco, Fundo Millahue. CONCEPCIÓN: Concepción; Bosque de Ramuntecho; Talcahuana. COQUIMBO: La Serena; Pichidanguí, Isla de los Locos. LINARES: Linares. LLANQUIHUE: 2–3 km NW of Ensenada; Peulla, 200 m, on buildings; Petrohué, buildings; Puerto Varas, 50 m, buildings; Parque Philippi. MAGELLANES: Punta Arenas. NUBLÉ: Chillan, Cordillera de Chillan. OSORNO: Osorno, city park; Purrancme; Termas de Puyehue, 240 m, buildings and gardens. SANTIAGO: Alhué; Cerro Santa Lucia; El Canelo; Quinta Normal; Tiltil; Yeso River, 1200 m, Cordilleras near Santiago. TALCA: Alto de Vilches, Andes; Talca. VALDIVIA: Valdivia, Isla Teja, farmland. VALPARAISO: Bosque Relicto; Lagunillas; Limache; Los Horcones; Quintero, Playa Piratas; Ventana; Viña del Mar.

JUAN FERNANDEZ ISLANDS: *Más a Tierra*: Bahía Cumberland; Galpon, Valle

Villagro; Puerto Ingles; Quebrada Pangal, Monte Oscuro, 100m; *Más Afuera*: Cerro Inocentes, 1000 m; Chorro Dona Anna; Chorro de Varadero; Plano de Chosa, 800-1000 m; Quebrada Casa; Quebrada Vaca.

Ariadna isthmica sp. n.

Figures 23-25, 30. Map 1.

Ariadna comata: Banks, 1929, Bull. Mus. Comp. Zool., 69(3):54. Not *A. comata* O. P.-Cambridge.

Holotype. A male from Panama, Barro Colorado Island, in the Museum of Comparative Zoology. The name is an adjective meaning isthmian, in reference to the species' Central American distribution.

Discussion. There appears to have been no reason, other than a guess based on distribution, for Banks' assignment of this species to *Ariadna comata*. As noted above, *A. comata* is here considered a synonym of *A. pilifera*. The present species is entirely Central American in distribution, while *pilifera* is recorded only from the southwestern United States and Mexico.

Color. Male. Carapace light to dark orange-brown with a narrow dark marginal line. Cephalic region lighter. Eyes narrowly rimmed with black. Chelicerae, labium, endites, and legs yellow to orange-brown, the anterior legs only slightly darker. Sternum yellow with a suffusion of purplish gray. Abdomen purplish gray over yellowish above, the yellowish showing through as many tiny light flecks. Venter of abdomen yellowish white with a dusting of purplish gray. Spinnerets and anal tubercle yellowish white.

Female. Coloration generally as in male, but tending to be darker, the carapace and first legs often a rich reddish mahogany. Legs sometimes suffused with purplish gray at distal ends of podomeres.

Structure. Dimensions of three males: Total length 4.6-6.9 mm, mean 6.00 mm; carapace length 2.4-3.3 mm, mean 2.93 mm; carapace width 1.6-2.2 mm, mean 1.92 mm; sternum length 1.5-2.0 mm, mean

1.78 mm; sternum width 0.92-1.12 mm, mean 1.020 mm.

Dimensions of seven females: Total length 7.5-11.7 mm, mean 9.04 mm; carapace length 3.4-4.2 mm, mean 4.14 mm; carapace width 2.1-2.6 mm, mean 2.28 mm; sternum length 2.0-2.4 mm, mean 2.14 mm; sternum width 1.14-1.35 mm, mean 1.227 mm.

Male palp. The bulb of the palp is small, its diameter less than twice that of the palpal tibia. The midpiece is short and narrows abruptly to the embolic portion, which joins the midpiece at a curve of almost ninety degrees. The embolic portion is equal to or slightly longer than the palpal tibia, and makes another nearly ninety degree bend at the tip. The palpal tibia is somewhat thickened at the base, but not inflated.

Male first leg. Metatarsus and tarsus slender and sinuous, without thickened spines or apophyses.

Investiture. Male. Entire body with a sparse coating of fairly long dark, curving hair, most of it making about a 45 degree angle with the cuticular surface. A few scattered hairs are straight, stiff, and almost erect. The chelicerae, tips of the endites, and tarsus of the palp are more densely clothed with hair than the rest of the body. On all the legs, most conspicuously the fourth, the tarsi and distal part of the metatarsi bear scopulae of stiff, short, translucent bristles bent into a minute hook at the tip.

Female. Differing from the male only slightly. Hair denser on metatarsi and tibiae of the first two legs, usually forming a conspicuous fringe. The scopular hairs of the male are replaced by long curved recumbent hairs without hooked tips.

Spination. See Table 11.

Diagnosis. Male. First metatarsus slender and sinuous, without apophyses or modified spines. Embolic portion of palp equal to palpal tibia in length or slightly longer. Metatarsal comb of four spines. Carapace length 2.4-3.3 mm. First tibia

usually with 3–5 retrolateral spines. Legs not annulate.

Female. Lateral spines present on tibiae I and II. Ventral tibial spines 4–4 on legs I and II. Metatarsal comb of four spines. Metatarsi II and III unarmed retrolaterally. A spine on palpal patella. Tibia III usually with one to two prolateral spines. Metatarsus III with seven to eight spines.

Distribution. Central America (Map 1).

Records. NICARAGUA. Musawas: Huaspuc River.

PANAMA. Bella Vista; Porto Bello. CANAL ZONE: Barro Colorado Island; Fort Sherman; Canal Zone Forest Preserve; Canal Zone Biological Area; Fort Davis; Gamboa.

Ariadna towarensis Simon

Map 4.

Ariadne towarensis Simon, 1893, Ann. Soc. Ent. Fr., 61:448. Female and immature syntypes from Venezuela, Colonia Tovar, in Muséum National d'Histoire Naturelle, Paris, examined. *Ariadna towarensis*: Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):738.

Discussion. As is the case with several other South American species, *A. towarensis* is known from only a few specimens, so that variability of the diagnostic characters is poorly known. The geographically nearest species, *A. tubicola*, *A. caerulea*, and *A. solitaria*, are, however, distinguished by characters that seem to warrant recognition of *tovarensis* as a distinct species.

Color. Carapace light mahogany, paler in cephalic area. Legs unmarked yellow to brownish yellow, the first leg a little darker than the others. Chelicerae, endites, labium and sternum brownish yellow. Abdomen shrunken from cuticle, but apparently was unmarked purplish gray above, scarcely lighter beneath.

Structure. Dimensions of two females: Total length 7.3, 7.4 mm; carapace length 2.7, 3.1 mm; carapace width 2.1, 2.2 mm; sternum length 1.6, 2.0 mm; sternum width 0.98, 1.14 mm.

Investiture. Much of the hair has been rubbed off. The pattern seems to be normal, the density perhaps a little less than usual. Fringes on the anterior legs are straight or slightly curved.

Spination. See Table 21.

Diagnosis. Lateral spines present on tibiae I and II; ventral tibial spines 4–4 on leg I, 4–3 on leg II, with proximal inner spine reduced on tibia II; metatarsal comb of four spines, no other ventral spines on fourth metatarsus; metatarsi II and III unarmed retrolaterally.

Distribution. Known only from north central Venezuela.

Records. VENEZUELA. DISTRITO FEDERAL: Colonia Tovar, ♀♀, (E. Simon), the syntypes; La Silla, NE of Caracas, 21 Dec. 1930, ♀, (J. G. Myers).

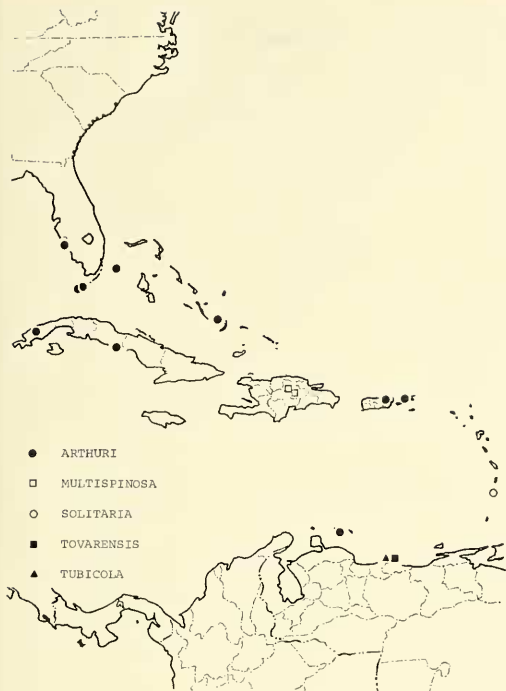
Ariadna arthuri Petrunkevitch

Figures 8, 26–27, 32. Map 4.

Ariadna arthuri Petrunkevitch, 1926, Trans. Connecticut Acad. Arts Sci., 28:48, fig. 8–10, “♀”. Immature holotype from Sta. Maria Bay, St. Thomas, Virgin Islands, in Peabody Museum, Yale, New Haven, not seen; *ibid.*, 1929, Trans. Connecticut Acad. Arts Sci., 30:59, figure 41, o. *Ariadna bicolor*: Lutz, 1915, Ann. New York Acad. Sci., 26:81; Franganillo, 1936, Los Arácnidos de Cuba hasta 1936, p. 38. Not *A. bicolor* (Hentz). *Ariadna solitaria*: Lutz, 1915, Ann. New York Acad. Sci., 26:81. Not *A. solitaria* Simon.

Discussion. The holotype of *A. arthuri* could not be located by Petrunkevitch when an attempt was made to borrow it in 1962. Types of both the other West Indian species have been examined and are distinctly different. The name *A. arthuri* is here applied to the common wide-ranging species found from southern Florida to Curaçao—almost certainly the one to which it belongs.

Petrunkevitch (1929) described and illustrated a second immature specimen of *A. arthuri*, collected on Desecheo Island, 18–20 February 1914. Presumably this spider is the one collected by Lutz and mentioned by him in his list of Greater Antillean spiders (1915) as *A. solitaria*. I have



Map 4

examined the specimen and find that, while Petrunkevitch's description is wrong in many details, the identification as *A. arthuri* is correct.

The specimen, or specimens, from Cuba, listed by Lutz (1915) as *A. bicolor*, have not been seen. All available material from Cuba belongs to *A. arthuri*, however. Franganillo (1936) simply cites *A. bicolor* as occurring in Cuba with no further data. Probably his citation is based upon Lutz's paper, to which he refers.

Color. Male and female. Carapace, sternum, and all appendages yellow to orange, slightly darker on first legs, chelicerae, and palpal tarsus (palps entirely light in male). Abdomen dusky yellow beneath and on sides, purplish gray above and around spinnerets ventrally.

Structure. Dimensions of two males: total length 4.0, 4.5 mm; carapace length 2.1, 2.2 mm; carapace width 1.4, 1.5 mm; sternum length 1.36, 1.44 mm; sternum width 0.82, 0.82 mm.

Dimensions of four females and two last instar juveniles: total length 4.8–7.0 mm, mean 5.98 mm; carapace length 2.0–3.5 mm, mean 2.67 mm; carapace width 1.2–2.2 mm, mean 1.64 mm; sternum length 1.2–2.1 mm, mean 1.55 mm, sternum width 0.73–1.14 mm, mean 0.922 mm.

Male palp. The bulb is quite small and the tibia moderately inflated, the diameter of the bulb equalling 1.5 times the tibial diameter or less. The midpiece of the bulb is longer than either the spine or the depth of the bulb, and equals or slightly exceeds the length of the tibia.

Male first leg. The tarsus and metatarsus are sinuous and slender. The middle third of the metatarsus is swollen. The inflation of the podomere is greatest at two-thirds of the distance from base to tip of the metatarsus. At this point, and opposite each other, are two ventrolateral protuberances; these are greatly enlarged spine sockets, each bearing a short thick spine. The distal pair of metatarsal spines and their sockets are somewhat enlarged also. The distal spine of the retrolateral ventral row on the tibia is slightly enlarged and flattened.

Investiture. Male. Spines are conspicuous, mostly stout, and of medium length. On the first tibiae the longest spines equal or slightly exceed the tibial diameter. Hair mostly as usual. The tarsi of all legs except the first pair bear ventral scopulae.

Female. Metatarsal and tibial spines on legs I and II lie at a very small angle to the podomeres, and the tips of the longer ones tend to curve inward toward the long axis of the leg. All the spines are slender, and the primary ones are very long, equalling or considerably exceeding half the length of the podomere.

Spination. See Table 3.

Diagnosis. Female. The presence of more than 4–4 ventral spines on tibiae I and II, and two spines in the metatarsal comb distinguish *A. arthuri* from all other American species except *A. tarsalis*. The latter may be separated by its

larger size, the lateral spination of the first two tibiae (see key or table), and distribution.

Male. The structure of the first leg distinguishes this species from the other known males. Specific diagnostic characters are the heavy spines set opposite each other distal to the middle of the metatarsus.

Distribution. Southern Florida and islands of the Gulf of Mexico and Caribbean (Map 4).

Records. FLORIDA: *Lee Co.*, Boca Grande, under rocks. *Monroe Co.*: Big Pine Key, some taken from cracks and shipworm burrows in driftwood on beach; Bill Find's Key, under bark of red mangrove; Rattlesnake Key, under bark of red mangrove; Squirrel Key, under bark of red mangrove.

WEST INDIES. BAHAMA ISLANDS: *South Bimini*; *Crooked Island*. CUBA: 7 km N of Viñales, Trinidad Mtns., Buenos Aires; Soledad. CURAÇAO: Siberië, 3 km N of Savonet, "stones"; Piscadera Bay. PUERTO RICO: Aguas Buenas, "cave entrance"; Desecheo Island, "under fallen leaves in a sea-grape thicket." VIRGIN ISLANDS: St. Thomas, Santa Maria Bay, "under bark of a log," the holotype. LESSER ANTILLES: no further data.

Ariadna multispinosa Bryant

Map 4.

Ariadna multispinosa Bryant, 1948, *Bull. Mus. Comp. Zool.*, 100(4):339. Female holotype from Dominican Republic, Loma Rucilla Mtns, in Museum of Comparative Zoology, examined.

Discussion. Although known only from one female and one juvenile, *A. multispinosa* is quite distinct from most other species. Five species are similar to *multispinosa* in some characters of the spination, but are distinguished by other characters that have high diagnostic value. Only *A. arthuri* and *A. tarsalis* are very close to *multispinosa* in structure. Until mature males and female of the latter two species

are available, the relationships cannot be adequately assessed.

Color. Carapace brown, legs yellowish brown, abdomen dark purplish gray above, dirty yellowish beneath.

Structure. Dimensions of female holotype: Total length 9.4 mm; carapace length 4.1 mm; carapace width 2.6 mm; sternum length 2.0 mm; sternum width 1.33 mm.

Investiture. Normal.

Spination. See Table 14.

Diagnosis. The absence of lateral spines from tibiae I and II, and presence of eight to eleven ventral spines in each row on tibiae I and II separate *A. multispinosa* from all other described American species.

Distribution. Known only from Hispaniola.

Records. DOMINICAN REPUBLIC. Loma Rucilla Mtns, Pico del Yaque, 8-19,000 ft (2440-3050 m), June 1938, ♀, (P. J. Darlington, Jr.), holotype; Cordillera Central, near Valle Nuevo, rain forest, 6000 ft (1830 m), Aug. 1938, ♂, (P. J. Darlington, Jr.), Paratype.

Ariadna tarsalis Banks

Map 3.

Ariadne tarsalis Banks, 1902, *Proc. Washington Acad. Sci.*, 4:57, plate 1, figure 9, immature. Immature holotype from Culpepper I., Galapagos Islands, in Museum of Comparative Zoology, Cambridge, examined. Banks, 1924, *Zoologica*, 5(9):95.

Ariadna tarsalis: Petrunkevitch, 1911, *Bull. Amer. Mus. Nat. Hist.*, 29:131; Bonnet, 1955, *Biblio. Aran.*, 2(1):737.

Discussion. This species is quite similar to *A. arthuri* Petr. of the West Indies. Unfortunately adequate comparison of the two species is impossible, because *A. tarsalis* is known only from six immature specimens. The spination character that separates the two species is a minor one, but the difference in size is considerable.

Color. Carapace and first legs orange-brown, the remaining legs paler orange to yellow-orange. Sternum and coxae yellow-orange, endites and labium brownish.

Abdomen purplish gray above, paler beneath.

Structure. Dimensions of holotype: Total length 7.5 mm, carapace length 3.7 mm, carapace width 2.3 mm, sternum length 2.1 mm, sternum width 1.08 mm.

Investiture. Normal.

Spination. See Table 20.

Diagnosis. Lateral spines usually present on tibiae I and II, ventral spines on these tibiae usually 6–6 or more; metatarsal comb of two spines; tibia I with 1–2 retrolateral spines, tibia II with none; carapace length 3.7–4.8 mm, mean of three specimens 4.15 mm.

Distribution. The Galapagos Islands.

Records. GALAPAGOS ISLANDS: *Culpepper Island*, immature holotype. *South Seymour Island*, April 1923, o, (N. Banks). *Duncan Island*, 23 June 1929, oo, (H. H. Cleaves). *Indefatigable Island*, 20 June 1929, oo, (H. H. Cleaves).

Ariadna mollis (Holmberg)

Figures 1, 16, 17, 22. Map 2.

Segestria mollis Holmberg, 1876, An. Agric. de la Repub. Argentina, 4:25, figure 6, ♀. Holotype from Buenos Aires (?), lost.

Segestria vulgarissima Holmberg, 1876, *ibid.*, 4: 25, figure 7, ♀. Holotype from Buenos Aires, lost.

Ariadna mollis: Mello-Leitão, 1933, Arch. Escol. Sup. Agric. Med. Vet., 10(1):12; 1944, Rev. Museo La Plata, 3(24):312, 322, figure 1, ♂; 1947, Arq. Museu Paranaense, 6(6):233, 234. Bonnet, 1955, Biblio. Aran., 2(1):735.

Discussion. After examining specimens from Buenos Aires and Montevideo, Mello-Leitão (1933) concluded that only one *Ariadna* with a dorsal abdominal pattern occurred in these regions. Consequently he synonymized *S. vulgarissima* and *A. boesenbergii* with *S. mollis*, at the same time correctly transferring *mollis* to the genus *Ariadna*.

Because the paper is likely to be inaccessible to many people, I here quote Mello-Leitão's discussion in full: "Tendo examinado exemplares de *Ariadna* da Província de Buenos Aires e de Montevideo

(colhidos por mim no Cerro) e confrontando-os com as descrições de Holmberg e de Keyserling, concluí pela identidade das mesmas, tendo prioridade a designação de Holmberg." Working only from descriptions as he apparently was, (that is, without any type specimens), it is not surprising that Mello-Leitão came to this conclusion. Keyserling's description is reasonably detailed, but those of Holmberg are almost devoid of useful information.

An examination of two specimens from the type series of *A. boesenbergii* (including both sexes) and a series of specimens from Buenos Aires reveals that *mollis* and *boesenbergii* are similar but distinct and apparently partly sympatric species. One vial from the Museo Argentino de Ciencias Naturales contained two female *mollis* and two female *boesenbergii*. The two species are almost identical in appearance, but are distinguished by several features of the spination.

The ecological relationships of *mollis* and *boesenbergii* should be carefully investigated. Not only are they different from most *Ariadna* in having an abdominal pattern, but they appear also to be sympatric sibling species that would be of interest as a study of character displacement or its absence. At present there are too few specimens available from too limited an area to suggest whether or not character displacement has occurred.

Mello-Leitão, in several papers, (1940, 1941, 1944, 1945, 1946), has given distribution records for *A. mollis* and *A. boesenbergii* that include many localities not listed below. His identifications of neither species are trustworthy, so the actual distribution of both species remains uncertain.

Color. Male. Carapace and chelicerae orange-brown. First legs a little lighter than carapace, the remaining legs progressively paler posteriorly. Sternum the color of the femora. Abdomen yellowish white dorsally with a purplish gray median longitudinal band in the anterior half and a series of short transverse bars posteriorly.

Female. Essentially as in male. The carapace and legs are darker, a rich reddish mahogany. The abdominal pattern on a female with enlarged abdomen consists of a lozenge anteriorly, back of which is a series of forward pointing chevrons. A narrow median band connects the first chevron to the lozenge, and continues to the anterior end of the abdomen (Fig. 1). The sides and venter of the abdomen are purplish gray.

Structure. Dimensions of one male: Total length 7.1 mm, carapace length 3.6 mm, carapace width 2.3 mm, sternum length 2.2 mm, sternum width 1.22 mm.

Dimensions of nine females: Total length 9.9–13.4 mm, mean 11.10 mm; carapace length 4.4–5.4 mm, mean 4.84 mm; carapace width 2.4–3.2 mm, mean 2.79 mm; sternum length 2.4–3.1 mm, mean 2.75 mm; sternum width 1.43–2.00 mm, mean 1.573 mm.

Male palp. Bulb small, only slightly wider than tibia. Tibia scarcely inflated. Midpiece and embolic portion of palp equal to each other in length or midpiece a little shorter.

Male first leg. Metatarsus and tarsus slender, sinuous, lacking apophyses or modified spines. Patella with a prolateral spine.

Investiture. Male generally without unusual features. Tarsi of legs II–IV scopulate ventrally. Female as usual.

Spinination. See Table 13.

Diagnosis. Male. First metatarsus sinuous, lacking apophyses and modified spines; metatarsal comb of five to seven spines; midpiece of palp short, about equal to embolic portion in length, abdomen with dorsal pattern.

Female. Separated from most other American *Ariadna* by the pattern of bars on the abdominal dorsum. Presence of lateral spines on tibiae I and II, 4–3 ventral spines on tibia II, and 5–7 spines in the metatarsal comb distinguish it from *A. boesenbergii*. Two other South American species reported to have abdominal pat-

terns, *A. conspersa* and *A. crassipalpus*, are not well enough known to be distinguished from *A. mollis*. (See discussion of these species under *Ariadna* Incertae Sedis below.)

Distribution. Argentina and southern Brazil.

Records. BRAZIL. PARANÁ: Caviana I., 1947, ♀, (A. Maller).

ARGENTINA. BUENOS AIRES: San Isidro, Oct. 1963, ♀; Punta Lara, 6 Apr. 1950, ♀♀; Moreno, Oct. 1947, ♀♀, (R. D. Schiapelli); Tigre, Nov. 1940, ♂, (F. Monros); Gral. Madariaga, Jan. 1962, ♀♀, (M. E. Galiano).

Ariadna boesenbergii Keyserling Figures 3, 46–48. Map 2.

Ariadna Bösenbergii Keyserling, 1877, Verhandl. der könig. kais. Zool.-Bot. Gesell., Wien, 1877: 223, pl. 7, fig. 7, 7a-b, ♂. Syntypes from Montevideo, Uruguay, in the Zoologisches Staats-Museum, Hamburg, examined.

Ariadna bösenbergi: Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:130.

Ariadne bösenbergi: Gerhardt, 1921, Arch. Natur., 87:92, 93, fig. 6, ♂.

Ariadna mollis: Mello-Leitão, 1933, Arch. Escol. super. agricul. med. vet., 10(1):12 (in part); *ibid.*, 1947, Arq. Mus. Paranaense, 6:234. Bonnet, 1955, Bibliog. Aran., 2(1):730, 735. Not *A. mollis* (Holmberg).

Discussion. Mello-Leitão (1933) mistakenly synonymized *A. boesenbergii* with *A. mollis*, and later (1947) reiterated the synonymy in statements prefacing a key to Brazilian *Ariadna*. The two species are similar in size and appearance, but details of spinination clearly separate them. Bonnet (1955) followed Mello-Leitão's treatment, at that time the most recent taxonomic opinion.

Among material borrowed from the Museo Argentino de Ciencias Naturales, I found a vial containing four female *Ariadna* collected at Moreno, Buenos Aires. Two of these specimens were *A. mollis*, the other two *A. boesenbergii*. The circumstances of occurrence of the spiders are unknown, but certainly at least a strong

presumption of sympatry is warranted. Only one other instance of collection of two species of *Ariadna* at one locality is known to me. (See under *A. boliviana*).

Coloration. In both sexes the coloration is very similar to that of *A. mollis*, orange-brown carapace and legs, dorsum of abdomen yellow with purplish gray transverse bars.

Structure. Dimensions of male lectotype: total length 8.0 mm; carapace length 3.7 mm; carapace width 2.4 mm; sternum length 2.1 mm; sternum width 1.1 mm.

Dimensions of three females: total length 7.9–9.5 mm, mean 8.63 mm; carapace length 3.6–4.2 mm, mean 3.78 mm; carapace width 2.1–2.4 mm, mean 2.21 mm; sternum length 2.0–2.4 mm, mean 2.12 mm; sternum width 1.1–1.2 mm, mean 1.12 mm.

Male palp. The bulb is small, the tibia short and much inflated, the diameter of the bulb equals less than 1.5 the tibial diameter. The mid-piece of the bulb is longer than either the depth of the bulb or the embolic portion, and slightly exceeds the length of the tibia.

Male first leg. The metatarsus and tarsus are slender and slightly curved, but not sinuous. No apophyses, protuberances, or unusually heavy spines are present on the metatarsus.

Investiture. Hair pattern presenting no unusual features.

Spination. See Table 5.

Diagnosis. Female. No prolateral or retrolateral spines on tibiae I or II; 4–4 ventral spines on tibiae I and II; dorsum of abdomen with a pattern of transverse bars on contrastingly colored background.

Male. First metatarsus slender, not or only very slightly sinuous, without apophyses or heavy spines. Metatarsal comb of 4 spines. Embolic spine shorter than palpal tibia, the latter short and inflated. Abdomen with dorsal pattern as in female.

Distribution. Southern Brazil, Uruguay, east central Argentina (Map 2).

Records. BRAZIL. RIO GRANDE DO SUL: Rio Grande.

URUGUAY. MONTEVIDEO (δ and η syntypes).

ARGENTINA. BUENOS AIRES: Moreno, Oct. 1947, $\eta\eta$ (R. D. Schiapelli).

Ariadna boliviana Simon

Figures 4, 6, 14, 51–52, 54–55.

Map 3.

Ariadna boliviana Simon, 1907, Ann. Soc. Ent. Belg., 51:262. Male and female syntypes from Espiritu Santo, Bolivia, in Muséum National d'Histoire Naturelle, Paris, examined. Petrunkevitch, 1911, Bull. Am. Mus. Nat. Hist., 29:130.

Discussion. The odd distribution pattern of the two known collections of this species is probably a result of lack of thorough coverage of the area by collectors. Both collections are from upland areas, but a wide lowland, the Gran Chaco, lies between them. In comparing males from the two localities, I can find no significant difference between them. Since other species of the genus have a rather large elevational range (p. 442) it is probable that *A. boliviana* occurs in suitable habitats in the Gran Chaco.

Color. Female. Carapace light orange-brown, darker in cephalic region. Legs yellow-brown, anterior legs and distal podomeres darker. Faint darker distal annuli on tibiae and metatarsi I and II. Abdomen pale purplish gray above, yellow on sides and venter.

Male. Carapace uniform mahogany, with very faint streaks radiating from thoracic groove. Abdomen purplish gray above, dirty yellow beneath. Legs yellow brown, first pair darker. Conspicuous purplish gray distal annuli on first tibia and metatarsus, fainter annuli on second tibia and metatarsus.

Structure. Dimensions of two males: total length 6.5, 6.5 mm; carapace length 3.2, 3.4 mm; carapace width 2.1, 2.2 mm; sternum length 1.6, 2.0 mm; sternum width 1.10, 1.08 mm.

Dimensions of a single female: total length 7.8 mm; carapace length 3.8 mm; carapace width 2.4 mm; sternum length 2.3 mm; sternum width 1.37 mm.

Male palp. Bulb of medium size, tibia somewhat inflated. Diameter of bulb more than 1.5 times that of tibia. Midpiece of palp short, less than diameter of bulb, about half the length of embolic portion. Embolic portion equalling tibia in length.

Male first leg. Metatarsus and tarsus slender and sinuous, without apophyses or heavy spines. Tibia with ordinary spines only, none modified.

Investiture. Male. Hair short and very sparse on carapace, otherwise normal. Tarsi and distal portion of metatarsi II-IV with ventral scopulae of short, translucent, minutely hooked bristles. Spines of relatively short to medium length, those on tibiae I and II shorter than, to slightly longer than, diameter of podomere.

Female. Normal.

Spination. See Table 6.

Diagnosis. Male. Metatarsus I slender and sinuous, lacking apophyses and modified spines; bulb of palp small, embolic portion about equal to palpal tibia in length; metatarsal comb of four spines; metatarsi and tibiae I and II with purplish gray distal annuli; carapace length 3.2-3.4 mm.

Female. Lateral spines present on tibiae I and II; 4-4 ventral spines on tibia I, 4-(2-3) on tibia II; metatarsal comb of four spines; metatarsi III bearing 9-12 spines of which 1-2 are retrolateral.

Distribution. Bolivia, southeastern Brazil (Map 3).

Records. BOLIVIA. ESPIRITU SANTO. ♂ and ♀ syntypes. (Garlepp).

BRAZIL. MINAS GERAIS: Diamantina, Minas de Serrinha, ♂, 1945 (Eliz. Cohn).

Ariadna fidicina (Chamberlin),
new combination

Figure 10. Map 1.

Citharoceps fidicina Chamberlin, 1924, Proc. California Acad. Sci., (4)12(28):608. Im-

mature holotype from Ensenada, Baja California del Norte, in California Academy of Science, examined.

Citharoceps californica Chamberlin and Ivie, 1935, Bull. Univ. Utah, 26(4):8, Figs. 22-23, ♀. Female (?) holotype from Laguna Beach, California, in University of Utah collection, not seen. NEW SYNONYMY.

Discussion. In its pattern of spination *A. fidicina* is rather divergent from most other *Ariadna*, but no more so than a few other undoubted *Ariadna* (e.g. *A. gracilis*). The genus *Citharoceps* was erected on the basis of the remarkable large coarse stridulating patches on the carapace. In the absence of males, the synonymy of *Citharoceps* with *Ariadna* may seem doubtful. The female, however, is clearly an *Ariadna* that happens to have stridulating grooves. Discovery of the male is expected to confirm the synonymy.

The holotype of *C. fidicina* was listed (Chamberlin, 1924) as being a female. The specimen has been dried, and is in very poor condition at present. It appears to be immature.

Citharoceps californica was described (Chamberlin and Ivie, 1935) in part as follows: "A larger and darker species than *C. fidicina* Chamberlin, which it otherwise resembles very closely. Known only from immature specimens, which range up to 9 mm in length." The holotype of *C. californica* was not available, but I have examined four of the paratypes (same collection data as the holotype) and find they are all mature. The size and color differences between the two described species are as one would expect as a consequence of the age difference.

Several appendages are missing from the holotype of *C. fidicina*, so that comparison of spination is scarcely possible. A paratype, from the collection of the Museum of Comparative Zoology, was also examined. There is no significant difference in any character between paratypes of *C. fidicina* and *C. californica* of similar size. There can be scarcely any question that the two are synonymous.

Color. Carapace a dark mahogany. Chelicerae and palps darker than carapace, legs lighter than carapace. Anterior legs darkest, the others progressively lighter posteriorly. Sternum orange-brown. Abdomen dark purplish gray above, sometimes with a series of yellow transverse markings producing an indistinctly barred pattern. Venter dirty yellowish mottled with purplish gray.

Structure. Dimensions of ten females: Total length 7.8–10.8 mm, mean 8.97 mm; carapace length 3.6–4.5 mm, mean 4.00 mm; carapace width 2.1–2.7 mm, mean 2.35 mm; sternum length 2.0–2.4 mm, mean 2.23 mm; sternum width 1.16–1.43 mm, mean 1.302 mm.

Investiture. Perhaps a little more densely clothed with hairs ventrally than other species, but the difference is scarcely noticeable in most preserved specimens. The spines are proportionately shorter than usual. The tibial spines are shorter than the diameter of the tibiae, and even the primary spines of metatarsi I and II exceed the metatarsal diameter only slightly. The extra pair of apical ventral spines on the metatarsi are usually between the distal spines of the two ventral rows.

Spination. See Table 9.

Diagnosis. The presence of a patch of coarse stridulating grooves on each side of the cephalic region immediately distinguishes *A. fidicina* from all other American *Ariadna*. In addition, the first and second metatarsi have four apical ventral spines, also a unique character among the American species. The metatarsal comb contains five to six spines.

Distribution. Pacific Coastal region of North America from Pacific Grove, California, to Ensenada, Baja California.

Records. CALIFORNIA. *Monterey Co.:* Pacific Grove; *Los Angeles Co.:* Glendale, Santa Monica Mtns, Saddle Peak, Agoura; *Orange Co.:* Laguna Beach, under bark of trees, holotype and paratypes of *Citharoceps californica*; Santa Ana Canyon, 12 mi. E of San Juan Capistrano.

MEXICO. BAJA CALIFORNIA DEL NORTE: Ensenada, holotype and paratypes of *Citharoceps fidicina*.

Ariadna gracilis Vellard

Figures 7, 28–29, 33. Map 2.

Ariadna gracilis Vellard, 1924, Arch. Inst. Vital Brazil, 2(2):160, figure 45, ♂. Male holotype from Caxias, Maranhão, originally deposited in collection of the Instituto Vital Brazil, not seen. Bonnet: 1955, Biblio. Aran., 2(1):732.

Discussion. According to a letter from Dr. Roched A. Seba of the Institute, the holotype of *A. gracilis* is no longer in the collection of the Instituto Vital Brazil. Fortunately Vellard's paper contains one of the few adequate descriptions of an *Ariadna* species, and a male in the collection of the Museum of Comparative Zoology matches the description closely. Assignment to this species of the females described below is based in part upon similarities in size, coloration, and metatarsal comb. The distribution of the female specimens, all unquestionably belonging to a single species, suggests further that *A. gracilis* is the common, if not the only, *Ariadna* throughout the Amazon Basin.

Ariadna obscura Blackwall and *A. taperae* Mello-Leitão are described as having a single apophysis on the first metatarsus of the male, at least similar to that of *A. gracilis*. Either or both of these could conceivably be synonymous with *gracilis*, but their occurrence outside the Amazon Basin suggests otherwise. Mello-Leitão himself (1947) later synonymized *A. taperae* and another of his own species, *A. campinensis*, with *obscura*, without giving reasons for doing so. No decisive information can be derived from the descriptions of any of these three species.

Color. Carapace rich reddish brown to duller mahogany brown. The appendages and underside of cephalothorax show the usual pattern of variation with respect to carapace color. Abdomen purplish gray above and yellowish to entirely yellowish white beneath. Anterior legs of male

darker than those of female, otherwise the sexes are similar in coloration.

Structure. Dimensions of one male: Total length 5.9 mm; carapace length 3.1 mm; carapace width 2.0 mm; sternum length 2.0 mm; sternum width 1.06 mm.

Dimensions of thirteen females: Total length 7.1–9.8 mm, mean 8.59 mm; carapace length 3.7–4.6 mm, mean 4.14 mm; carapace width 2.2–2.9 mm, mean 2.4 mm; sternum length 2.2–2.9 mm, mean 2.49 mm; sternum width 1.16–1.63 mm, mean 1.347 mm.

Male palp. Bulb very small, in retro-lateral view its diameter not exceeding the maximum diameter of the tibia. Tibia somewhat inflated; midpiece of palp longer than spine or embolic portion, shorter than tibia. Midpiece and embolic portion together slightly longer than tibia. An inner distal spine on the tibia.

Male first leg. Metatarsus slender, sinuous, bearing a large ventrolateral apophysis at about the middle. The apophysis bears a forward-pointing spine distally. The right metatarsus has a thick, heavy, but very small prolateral spine distal to the apophysis. A slightly modified distal spine in the inner ventral row of the tibia.

Investiture. Male. Hair largely rubbed off, but apparently normal in pattern. Tarsi of all but the first pair of legs with ventral scopulae at least distally.

Female. No unusual features.

Spination. See Table 10.

Diagnosis. Male. The single ventral apophysis on the first metatarsus distinguishes *A. gracilis* from all other American species, except possibly *A. obscura* (see discussion above).

Female. The presence of two or three prolateral spines on femur I separates the female from all other American species except *A. multispinosa*. From the latter, *A. gracilis* differs by having lateral tibial spines and fewer ventral tibial spines.

Distribution. Northern Brazil and eastern Peru, in the Amazon Basin and along

river valleys in the higher regions (Map 2).

Records. BRAZIL. AMAZONAS: Tefé. PARA: Belem. Caxias, ♂ holotype, St. André. BAHIA: Salvador.

PERU. SAN MARTÍN: Mishqui-Yacu, 20 km NE Moyobamba, 1200 m (3940 ft).

Ariadna obscura (Blackwall)

Map 3.

Dysdera obscura Blackwall, 1858, Ann. Mag. Nat. Hist., 3(2):334. Immature holotype from Brazil, Pernambuco, destroyed. Blackwall, 1861, Ann. Mag. Nat. Hist., 3(48):446; Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:132; Bonnet, 1956, Biblio. Aran., 2(2):1632.

Ariadna [*sic*] *campinensis* Mello-Leitão, 1916, Broteria, 15(1):13. Female holotype from Campina Grande, Paraíba do Norte, in Museu Nacional, Rio de Janeiro, not seen. Mello-Leitão, 1947, Arq. Mus. Paranaense, 6(6):234; Bonnet, 1955, Biblio. Aran., 2(1):732.

Ariadna taperae Mello-Leitão, 1926, Ann. Acad. Brasil. Sci., 1(2):93. Male and female syntypes from "Tapera," in Museu Nacional, Rio de Janeiro, not seen. Mello-Leitão, 1947, Arq. Mus. Paranaense, 6(6):234.

Ariadna obscura: Mello-Leitão, 1947, Arq. Mus. Paranaense, 6(6):234.

Ariadna taperana: Bonnet, 1955, Biblio. Aran., 2(1):737.

Discussion. The placement of these three species is made very difficult by the inaccessibility of all three types and the fact that only one specimen is available from the general region where the types were collected, about 100 miles from the nearest type locality.

Blackwall's description, incomplete and incorrect as it is, suffices to place *Dysdera obscura* in the genus *Ariadna*. It contains nothing, however, which could possibly identify any given species of the genus. The type is not available, and Cooke (in litt.) states that the specimen was probably destroyed before Blackwall's collection came into the Oxford Museum.

In 1947, Mello-Leitão synonymized his own species *campinensis* and *taperae* with *obscura*, without giving any reasons for his action. It is unlikely that he had ever seen an authentic specimen of *obscura*. The synonymy is justifiable on the basis of dis-

tribution, however. All three species, as well as the specimen assigned to *A. obscura* below, originate in a sector of easternmost Brazil about 350 miles (560 km) in diameter. Except for a few insular species, most frequently collected American *Ariadna* have a range far larger than this. The probability that more than one species occupies this part of Brazil seems quite small.

The discrepancies between the descriptions of Mello-Leitão's two species and the specimen from Natal are more serious, although Mello-Leitão offers only a small fraction of the information available from his specimens. The disagreements in numbers of metatarsal spines are relatively unimportant, lying, as they do, within the normal range of variation of a single deme in other species. The tibial spination, and to some extent that of the third metatarsus, offers problems, however. Both *obscura* and *campinensis* are described as having 5-5 or 6-6 ventral spines on tibiae I and II. The specimen from Natal has 4-4 on tibia I and 4-1 on tibia II. An unusually variable species, such as *A. pilifera*, might include all three variants of first tibial spination, but the difference between 4-1 and 6-6 on the second tibia, a leg segment normally showing a highly stable pattern of spination, is far too great for any single species known to me.

Further inspection of Mello-Leitão's descriptions, and comparison with many specimens of other species, suggests that his published data are in error, perhaps seriously so. *Ariadna campinensis*, for example, is described as having 6-6 ventral spines in four areas, the ventral surfaces of tibiae and metatarsi I and II. Examination of 158 specimens of *A. maxima* and *A. bicolor* reveals not a single specimen having such a degree of symmetry or uniformity of spine numbers in all four areas. In fact, I can not locate in my records a single instance of complete symmetry in spination in any mature *Ariadna*.

Almost certainly, therefore, the meager

information on spination given by Mello-Leitão is inaccurate. With some reluctance, because of the magnitude of the discrepancies between descriptions and specimen, I conclude that the best course is to regard the three described species as synonymous, and to assume, until otherwise demonstrated, that the specimen on hand is *Ariadna obscura*.

Color. Male. Blackwall (1861) describes the male as generally paler than the female, but with the anterior legs browner, and the palpi yellowish white.

Female. Carapace and legs I and II deep brown. The other legs paler. Sternum, labium, and undersides of coxae only a little lighter than carapace. Abdomen dark gray above, slightly paler beneath.

Structure. Dimensions of one female: total length 8.5 mm; carapace length 4.1 mm; carapace width 2.4 mm; sternum length 2.3 mm; sternum width 1.37 mm.

Male palp. Details of structure unknown.

Male first leg. Described by Blackwall (1861) as having a retrolateral or ventroretrolateral apophysis ending in a short spine.

Investiture. Female. Hair largely rubbed off, but apparently of normal pattern. Lateral spines of tibiae I and II, and pro-lateral spines of patellae quite short, appressed, and almost invisible against the dark brown leg.

Spination. See Table 16.

Diagnosis. Male. Blackwall's description of the male indicates a similarity to *A. gracilis*, but to no other known male. The data given are insufficient to diagnose *A. obscura* more precisely.

Female. The metatarsal comb of two spines distinguishes *A. obscura* from most other species. From the others with two-spined comb, it may be separated by the presence of spines on the patellae of legs I and II, a unique character in females of American *Ariadna*.

Distribution. Eastern Brazil, in the states of Rio Grande do Norte, Paraíba, Pernambuco, and possibly Bahia.

Records. BRAZIL. RIO GRANDE DO NORTE: Natal, June 1911, Stanford Exp., ♀, (W. M. Mann); PARAIBA: Campina Grande (type locality of *A. campinensis*); PERNAMBUCO: no further data (type locality of *A. obscura*); Tapera (Pernambuco or Bahia?), no further data (type locality of *A. taperae*).

Ariadna solitaria Simon

Map 4.

Ariadne solitaria Simon, 1891, Proc. Zool. Soc. London, 1891:556. Immature holotype from Lesser Antilles, St. Vincent Island, in British Museum (Natural History), examined.

Ariadna solitaria Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):737.

Not *A. solitaria*: Lutz, 1915, Ann. New York Acad. Sci., 26:81 (= *A. arthuri*).

Discussion. Although known only from the immature holotype, this species is clearly distinct from the two other West Indian *Ariadna*, both of which have more ventral tibial spines. No other *Ariadna* has been taken in the Windward Islands or the nearby coast of northern South America. Possibly *A. solitaria* will ultimately prove to have a more extensive range in this region.

Color. Carapace and chelicerae orange-brown, lighter in cephalic region. Legs and palps yellow, tarsus of palp, tarsi of legs I and II, metatarsus of leg I darker. Endites, labium, and sternum yellow. Abdomen grayish yellow above, yellow beneath.

Structure. Dimensions of holotype: Total length 9.0 mm, carapace length 4.2 mm, carapace width 2.0 mm; sternum length 2.1 mm; sternum width 0.979 mm.

Investiture. Largely rubbed off, but apparently plentiful and of usual arrangement.

Spination. See Table 19.

Diagnosis. Lateral spines present on first two tibiae; ventral spines of tibiae I and II 4-4; metatarsal comb of 4 spines. Spination of third leg: 4 ventral, 2 pro-

lateral, 0 retrolateral spines on metatarsus; 2 ventral, no lateral spines on tibia.

Distribution. Thus far found only on St. Vincent, Windward Islands.

Record. ST. VINCENT: Baronallie, near sea-level, open valley, under rubbish, ♂, (H. H. Smith).

Ariadna tubicola Simon

Map 4.

Ariadne tubicola Simon, 1893, Ann. Soc. Ent. Fr., 61:448. Immature syntypes from Venezuela, Caracas, in Muséum National d'Histoire Naturelle, Paris, examined.

Ariadna tubicola: Petrunkevitch, 1911, Bull. Amer. Mus. Nat. Hist., 29:131; Bonnet, 1955, Biblio. Aran., 2(1):738.

Discussion. The two immature syntypes are the only specimens presently known. They seem to me sufficiently distinct from the other *Ariadna* of northwestern South America to be considered a separate species. Again, many more specimens will be required to establish the status of the form firmly.

Color. Carapace orange, legs yellow. Metatarsi I and II with distal and sub-basal dark annuli. Chelicerae, endites, labium, and sternum brownish yellow. Abdomen in poor condition, yellow with a suggestion of a median series of purplish gray markings of the usual form.

Structure. Dimensions of immature lectotype: Total length 7.4 mm, carapace length 3.0 mm, carapace width 1.8 mm, sternum length 1.7 mm, sternum width 1.08 mm.

Investiture. Hair reddish brown, of usual distribution.

Spination. See Table 22.

Diagnosis. Lateral spines present on tibiae I and II; ventral tibial spines more than 4-4 on I and II; metatarsal comb of 4-5 spines; a single prolateral spine on femur I; palpal patella with one prolateral spine; tarsi very short.

Distribution. North central Venezuela (Map 4).

Record. VENEZUELA. DISTRITO FE-

DERAL: Caracas, oo, (E. Simon), syn-types.

Ariadna Incertae Sedis

Map 3.

Ariadna conspersa Mello-Leitão, 1940, Arq. Inst. Biol. Sao Paulo, 11(30):256.

Dysdera crassipalpus Blackwall, 1863, Ann. Mag. Nat. Hist., ser. 3, 11(61):43.

Ariadna dubia Mello-Leitão, 1917, Broteria, 15:82.

Ariadna spinifera Mello-Leitão, 1947, Arq. Museu Paranaense, 6(6):233, figure 1, ♂.

No holotypes or specimens from the type localities of any of these species have been seen. Blackwall's description is worthless, those of Mello-Leitão are so fragmentary, and probably inaccurate, as to be unusable. Two of the species, *crassipalpus* and *dubia*, were described from specimens taken in Rio de Janeiro, a male and a female respectively. The holotypes of *A. spinifera* and *A. conspersa* are a male and a female from Curitiba, Paraná.

Similar situations involving *A. bicolor* and *A. maxima* were readily solved, and it is tempting to apply the same procedure to the present species. Four species described from the United States and four from Chile were reduced to one in each case when study of many specimens from widely scattered localities revealed that the populations in each area were quite uniform. My original inclination, therefore, was to unite all the southeastern Brazilian species under one or, at most, two names. Certainly the description of a male and female from each of the two Brazilian sites suggested each pair of names referred to a single species.

The relatively short airline distance of 400 miles separates Rio de Janeiro and Curitiba. Eight other American *Ariadna*, all the species that are fairly well-known, range over distances much greater than 400 miles. Furthermore, in North America, Central America, and the West Indies the pattern of distribution of *Ariadna* is one of allopatry of all species so far as presently known. This statement is true for most of South America, also, but so few specimens

of most species have been collected in South America that the known distribution there is of little significance.

Unfortunately the simple treatment that was appropriate for *A. bicolor* and *A. maxima* can not be justified for the Brazilian species. A small collection of specimens from São Paulo (almost exactly halfway between Rio de Janeiro and Curitiba) has been examined. This collection contains three, or possibly four, species. *Ariadna mollis* has also been collected in southeastern Brazil, and may occur in the São Paulo region.

At present I find the task of matching the available specimens with the published names impossible. Examination of type material would be a step toward solving the problem, but in itself might be insufficient. Series of specimens from several localities, certainly including Rio de Janeiro and Curitiba, will be required. These series must include a number of mature females (five at the minimum), and should also include at least one male from each locality. The material already on hand suggests that some of the species are not very different from each other morphologically.

The region from Buenos Aires, Argentina, to Diamantina in the Brazilian state of Minas Gerais presents more serious taxonomic problems and more interesting biological ones in the genus *Ariadna* than any other part of the Americas. The only indications of sympatry of two or more species of *Ariadna* are in this area and in southern Chile. Besides the situation described above, *A. mollis* and *A. boesenbergii* have apparently been taken together in Buenos Aires, and *A. boliviana* was found with another (undetermined) species at Diamantina. Plainly, on-the-spot investigations at least in southeastern Brazil are needed.

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ADDENDUM

Since this work was completed, additional specimens have become available through the cooperation of Dr. W. J. Gertsch and Mr. Vincent Roth, of the American Museum of Natural History. One of these specimens is the first known male of *Ariadna fidicina* (originally *Citharoceps fidicina*). It has the stridulating patches on the carapace, as in the female. Other structural characters agree with the definition of *Ariadna*, confirming the synonymy of *Citharoceps* with *Ariadna*, as expected.

The remaining new material consists of one male, many mature females, and a few juveniles of *A. tarsalis*, collected on several of the Galapagos Islands. Mature *Ariadna* from the Galapagos have not previously been available to me. These specimens agree in all respects with those described above as *Ariadna peruviana*, new species. Therefore *A. peruviana* is hereby synonymized with *A. tarsalis* Banks. The presence of *A. tarsalis* on the mainland of South America is unexpected and surprising. However, a coastal species at Lima is admirably placed for rafting to the Galapagos on the Humboldt Current.

A later paper will give details on the above specimens, with illustrations, and with modifications of the descriptions and keys for *A. tarsalis* and *A. fidicina*.

TABLE 2. SPINATION OF *ARIADNA PERUVIANA*

		Male N = 4			Female N = 11-12		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	4	0	0	12
	Tibia	0	0	4	3-5	3	6
	Tarsus	0	0	4	6-8	6	6
Leg:							
1—Meta.—	Ventral ou.	1	1	4	8-10	9	7
	Ventral in.	2	2	4	8-10	9	5
	Prolateral	0-1	0	3	0	0	11
Tibia—	Ventral ou.	4-6	4	3	4-6	4	14
	Ventral in.	4	4	4	4-5	4	10
	Ventral su.	0-1	0, 1	2 ea.	0	0	11
	Dorsal	1	1	4	0	0	11
Femur—	Dorsal ou.	1	1	4	1	1	11
	Dorsal mi.	2	2	4	1-2	1	10
	Dorsal in.	1-2	2	3	0-2	1	8
	Prolateral	1	1	4	1	1	11
2—Meta.—	Ventral ou.	3	3	4	7-10	9	7
	Ventral in.	3	3	4	9-11	9	6
	Prolateral	1-2	1	3	0	0	11
	Retrolateral	3	3	4	0	0	11
Tibia—	Ventral ou.	4	4	4	3-5	4	6
	Ventral in.	1-2	1, 2	2 ea.	4	4	11
	Prolateral	3	3	4	2-3	3	10
	Retrolateral	4	4	4	2-3	3	8
	Dorsal	0-1	1	3	0	0	11
Femur—	Dorsal ou.	2	2	4	0-1	1	10
	Dorsal mi.	4	4	4	1-4	1	6
	Dorsal in.	1-2	2	3	1-2	1	7
3—Meta.—	Ventral ou.	3	3	4	3	3	12
	Ventral in.	2	2	4	2	2	12
	Prolateral	4	4	4	3-4	4	8
	Retrolateral	2-3	2, 3	2 ea.	0-3	1	6
Tibia—	Ventral ou.	3-5	3	3	3	3	12
	Ventral in.	1-2	1	3	0-2	0	10
	Prolateral	2	2	4	1-2	2	11
	Retrolateral	1-3	1, 3	2 ea.	0	0	12
Femur—	Dorsal ou.	0-2	1	2	0	0	12
	Dorsal mi.	3-5	3	2	0-3	0	6
	Dorsal in.	2	2	4	1-2	2	9
4—Meta.—	Ventral ou.	2-3	2, 3	2 ea.	1-2	1	8
	Ventral in.	3-4	3	3	3-4	3	9
	Ventral su.	1	1	4	0-1	1	7
Tibia—	Ventral ou.	0-1	0, 1	2 ea.	0-1	0	10
	Ventral in.	0-1	0	3	0	0	12
	Retrolateral	1-2	1, 2	2 ea.	0-1	0	10
Femur—	Dorsal ou.	0	0	4	0	0	12
	Dorsal mi.	7-11		1 ea.	0-4	2	6
	Dorsal in.	0-2	2	2	0-1	0	11

TABLE 3. SPINATION OF *ARIADNA ARTHURI*

		Male N = 4			Female N = 9-10		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	4	0	0	9
	Tibia	0	0	4	4-9	4	5
	Tarsus	0	0	4	5-8	6, 7	3 ca.
Leg:							
1—Meta.—	Ventral ou.	2	2	4	6-9	7	4
	Ventral in.	3	3	4	6-8	7, 8	4 ca.
Tibia—	Ventral ou.	7	7	4	5-8	6	4
	Ventral in.	1-2	1, 2	2 ea.	4-6	6	7
	Prolateral	3	3	4	2-3	3	6
	Retrolateral	3	3	4	2	2	10
	Dorsal	1	1	4	0	0	10
Femur—	Dorsal ou.	1	1	4	1	1	10
	Dorsal mi.	1-2	1, 2	2 ea.	1	1	10
	Dorsal in.	2	2	4	1-2	2	6
	Prolateral	0-1	0, 1	2 ea.	1	1	10
2—Meta.—	Ventral ou.	4	4	4	6-9	7	5
	Ventral in.	3	3	4	7-8	8	8
	Retrolateral	2	2	4	0	0	10
Tibia—	Ventral ou.	7	7	4	6-8	7	5
	Ventral in.	1	1	4	4-7	6	7
	Ventral su.	0-1	0, 1	2 ea.	0	0	10
	Prolateral	3	3	4	1-3	3	6
	Retrolateral	4	4	4	1-2	2	9
	Dorsal	0-1	0	3	0	0	10
	Femur—	Dorsal ou.	1	1	4	1	1
Dorsal mi.	1-2	2	3	0-1	1	7	
Dorsal in.	2	2	4	1-2	2	6	
3—Meta.—	Ventral ou.	3	3	4	3	3	10
	Ventral in.	1	1	4	1	1	10
	Prolateral	2	2	4	0-3	0	4
	Retrolateral	2	2	4	0	0	10
Tibia—	Ventral ou.	3	3	4	2-3	3	9
	Ventral in.	0	0	4	0	0	10
	Retrolateral	2-3	2, 3	2 ea.	1-2	1	9
Femur—	Dorsal ou.	1	1	4	0-1	1	6
	Dorsal mi.	0-3		1 ea.	0	0	10
	Dorsal in.	1	1	4	0-1	0	6
4—Meta.—	Ventral ou.	1	1	4	1	1	10
	Ventral in.	2	2	4	2	2	10
	Ventral su.	1	1	4	0	0	10
Femur—	Dorsal ou.	0	0	4	0	0	10
	Dorsal mi.	2-5	5	2	0	0	10
	Dorsal in.	0-1	0, 1	2 ea.	0	0	10

TABLE 4. SPINATION OF *ARIADNA BICOLOR*

		Male N = 100			Female N = 200		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	100	0-1	0	198
	Tibia	0	0	100	0-6	3	139
	Tarsus	0	0	100	5-16	9	53
Leg:							
1—Meta.	Ventral ou.	2-3	2	97	6-11	8	107
	Ventral in.	3-4	3	96	7-11	8	100
Tibia	Ventral ou.	3-5	4	97	3-6	4	184
	Ventral in.	2-5	4	86	2-6	4	165
	Prolateral	0-5	4	46	0	0	200
	Retrolateral	0-5	4	79	0	0	200
Femur	Dorsal ou.	0-2	1	90	0-1	0	199
	Dorsal mi.	1-6	3	24	0-2	0	194
	Dorsal in.	0-2	2	55	0-2	0	162
2—Meta.	Ventral ou.	2-4	3	97	5-12	8	103
	Ventral in.	2-7	3	95	7-12	9	88
	Prolateral	0-3	1	45	0	0	200
	Retrolateral	0-2	2	82	0	0	200
Tibia	Ventral ou.	3-6	4	90	3-5	4	190
	Ventral in.	1-2	2	97	0-4	2	188
	Prolateral	0-5	3	46	0	0	200
	Retrolateral	0-5	3	33	0	0	200
Femur	Dorsal ou.	0-2	1	66	0	0	200
	Dorsal mi.	0-5	4	42	0-2	0	195
	Dorsal in.	0-3	1	68	0-2	1	167
3—Meta.	Ventral ou.	2-4	3	96	2-6	3	186
	Ventral in.	0-2	1	94	0-3	1	189
	Prolateral	0-5	2	54	1-4	2	160
	Retrolateral	0-2	0	92	0	0	200
Tibia	Ventral ou.	1-6	4	44	0-4	2	99
	Ventral in.	0-3	1	52	0	0	200
	Prolateral	0-4	1	44	0-1	0	181
Femur	Dorsal ou.	0	0	100	0	0	200
	Dorsal mi.	0-5	3	48	0-1	0	199
	Dorsal in.	0-2	1	85	0-2	1	101
4—Meta.	Ventral ou.	1-3	2	81	0-2	1	170
	Ventral in.	3-5	3	91	2-4	3	191
	Prolateral	0-3	2	64	0	0	200
Tibia	Ventral ou.	0-4	2	28	0	0	200
Femur	Dorsal ou.	0	0	100	0	0	200
	Dorsal mi.	1-8	3	40	0	0	200
	Dorsal in.	0-2	1	53	0	0	200

TABLE 5. SPINATION OF *ARIADNA BOESENBERGII*

		Male N = 2			Female N = 7-8		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	2	0	0	8
	Tibia	0	0	2	2-4	3, 4	3 ea.
	Tarsus	0	0	2	4-6	5	4
Leg:							
1—Meta.—	Ventral ou.	3, 4		1 ea.	5-9	8	3
	Ventral in.	4	4	2	6-8	7	3
	Prolateral	1	1	2	0	0	7
	Retrolateral	2	2	2	0	0	7
Tibia—	Ventral ou.	4, 6		1 ea.	4	4	7
	Ventral in.	4	4	2	4	4	7
	Prolateral	3, 4		1 ea.	0	0	7
	Retrolateral	6	6	2	0	0	7
Femur—	Dorsal ou.	1	1	2	0	0	7
	Dorsal mi.	2, 3		1 ea.	0-1	0	6
	Dorsal in.	2	2	2	0-1	0	6
2—Meta.—	Ventral ou.	3	3	2	6-9	7	4
	Ventral in.	4	4	2	6-8	7	4
	Prolateral	1	1	2	0	0	8
	Retrolateral	2	2	2	0	0	8
Tibia—	Ventral ou.	4	4	2	4-5	4	7
	Ventral in.	4	4	2	3-4	4	6
	Ventral su.	1	1	2	0	0	8
	Prolateral	4	4	2	0	0	8
	Retrolateral	5, 6		1 ea.	0	0	8
Femur—	Dorsal ou.		2	2	0	0	8
	Dorsal mi.	2, 3		1 ea.	0-1	0	6
	Dorsal in.	2	2	2	0-2	2	4
3—Meta.—	Ventral ou.	3	3	2	2-3	3	6
	Ventral in.	2	2	2	1	1	8
	Prolateral	3	3	2	1-2	1	5
Tibia—	Ventral ou.	4	4	2	1-4	3	5
	Prolateral	2	2	2	0	0	8
	Retrolateral	1	1	2	0	0	8
Femur—	Dorsal ou.	0	0	2	0	0	8
	Dorsal mi.	3	3	2	0	0	8
	Dorsal in.	1, 2		1 ea.	0-1	1	6
4—Meta.—	Ventral ou.	2	2	2	1	1	7
	Ventral in.	4	4	2	4	4	7
Tibia—	Ventral ou.	2, 3		1 ea.	0	0	7
Femur—	Dorsal ou.	0	0	2	0	0	7
	Dorsal mi.	8, 9		1 ea.	0	0	7
	Dorsal in.	1	1	2	0-1	0	5

TABLE 6. SPINATION OF *ARIADNA BOLIVIANA*

		Male N = 4			Female N = 2		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	4	1	2	2
	Tibia	0	0	4	6	6	2
	Tarsus	0	0	4	10	10	2
Leg:							
1—Meta.—	Ventral ou.	1-2	1, 2	2 ea.	7, 8		1 ea.
	Ventral in.	2-3	2, 3	2 ea.	8	8	2
Tibia—	Ventral ou.	4	4	4	4	4	2
	Ventral in.	1-2	1, 2	2 ea.	4, 5		1 ea.
	Ventral su.	0-1	0, 1	2 ea.	0	0	2
	Prolateral	3-4	3, 4	2 ea.	3	3	2
	Retrolateral	7-8	7, 3	2 ea.	3	3	2
	Dorsal	1-2	1	3	0	0	2
Femur—	Dorsal ou.	1	1	4	1	1	2
	Dorsal mi.	3-4	4	3	1	1	2
	Dorsal in.	1-2	2	3	2	2	2
	Prolateral	1?	1?	4	1	1	2
2—Meta.—	Ventral ou.	3-4	3	3	7, 8		1 ea.
	Ventral in.	2	2	4	8, 9		1 ea.
	Retrolateral	2	2	4	1	1	2
Tibia—	Ventral ou.	4	4	4	4, 5		1 ea.
	Ventral in.	1-2	1, 2	2 ea.	3	3	2
	Ventral su.	1	1	4	0	0	2
	Prolateral	3	3	4	3	3	2
	Retrolateral	4-5	4, 5	2 ea.	3, 4		1 ea.
	Dorsal	0-1	1	3	0	0	2
Femur—	Dorsal ou.	1	1	4	1	1	2
	Dorsal mi.	3-4	4	3	1	1	2
	Dorsal in.	1-2	1, 2	2 ea.	2	2	2
3—Meta.—	Ventral ou.	3	3	4	3	3	2
	Ventral in.	1-2	1, 2	2 ea.	2, 3		1 ea.
	Prolateral	2-3	2, 3	2 ea.	3, 4		1 ea.
	Retrolateral	2	2	4	1, 2		1 ea.
Tibia—	Ventral ou.	3-4	3	3	3	3	2
	Prolateral	2	2	4	1, 2		1 ea.
	Retrolateral	2-3	2	3	1	1	2
Femur—	Dorsal ou.	0-1	1	3	1	1	2
	Dorsal mi.	2-4	3	2	1	1	2
	Dorsal in.	1-2	3	2	1	1	2
4—Meta.—	Ventral ou.	0-1	0, 1	2 ea.	0	0	2
	Ventral in.	4-5	4	3	3, 4		1 ea.
Femur—	Dorsal ou.	0	0	4	0	0	2
	Dorsal mi.	2-5		1 ea.	0	0	2
	Dorsal in.	0-1	0, 1	2 ea.	0	0	2

TABLE 7. SPINATION OF *ARIADNA CAERULEA*

		Male N = 2			Female N = 11-12		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	2	0	0	12
	Tibia	0	0	2	3-5	3	6
	Tarsus	0	0	2	4-11	5	5
Leg:							
1—Meta.—	Ventral ou.	1	1	1	8-11	8, 10	5 ea.
	Ventral in.	1	1	1	8-11	8, 9	4 ea.
Tibia—	Ventral ou.	6	6	1	4-6	4	7
	Ventral in.	1	1	1	4-7	7	8
	Prolateral	4	4	1	0-3	2	6
	Retrolateral	4	4	1	0-2	2	5
Femur—	Dorsal ou.	2	2	1	0-1	1	10
	Dorsal mi.	4	4	1	0-1	1	11
	Dorsal in.	1	1	1	1-2	2	10
	Prolateral	1	1	1	1	1	12
2—Meta.—	Ventral ou.	2	2	2	7-10	7-9	3 ea.
	Ventral in.	3	3	2	8-11	9	5
	Retrolateral	0-1	0, 1	1 ea.	0	0	11
Tibia—	Ventral ou.	6	6	2	4-7	4	6
	Ventral in.	2-3	2, 3	1 ea.	3-4	4	9
	Ventral su.	0-1	0, 1	1 ea.	0	0	11
	Prolateral	3-4	3, 4	1 ea.	0-3	3	4
	Retrolateral	4	4	2	0-3	0	8
	Dorsal	1-2	1, 2	1 ea.	0	0	11
Femur—	Dorsal ou.	2	2	2	0-1	1	8
	Dorsal mi.	3-4	3, 4	1 ea.	1	1	11
	Dorsal in.	1-2	1, 2	1 ea.	1	1	11
3—Meta.—	Ventral ou.	3	3	1	3	3	12
	Ventral in.	1	1	1	0-2	1	7
	Prolateral	4	4	1	0-3	2	6
	Retrolateral	2	2	1	0	0	12
Tibia—	Ventral ou.	4	4	1	2-3	3	7
	Ventral in.	1	1	1	0	0	12
	Prolateral	2	2	1	0-1	0	9
	Retrolateral	3	3	1	0-2	0	10
Femur—	Dorsal ou.	1	1	1	0-1	0	11
	Dorsal mi.	4	4	1	0	0	12
	Dorsal in.	1	1	1	0-1	1	10
4—Meta.—	Ventral ou.	2-3	2, 3	1 ea.	0-1	0	7
	Ventral in.	3	3	2	3-4	4	9
	Prolateral	0-1	0, 1	1 ea.	0	0	11
Tibia—	Ventral ou.	1	1	2	0	0	11
Femur—	Dorsal ou.	0	0	2	0	0	11
	Dorsal mi.	3-5	3, 5	1 ea.	0	0	11
	Dorsal in.	1	1	2	0	0	11

TABLE 8. SPINATION OF *ARIADNA CEPHALOTES*

		Female N = 15-18		
		Range	Mode	n
Palp	Patella	0	0	17
	Tibia	2-5	3	13
	Tarsus	5-15	8	5
Leg:				
1—Meta.—	Ventral ou.	7-11	10	7
	Ventral in.	6-11	9	8
Tibia—	Ventral ou.	4-7	4	14
	Ventral in.	4-5	4	16
	Retrolateral	0-4	0	11
Femur—	Prolateral	1	1	17
2—Meta.—	Ventral ou.	7-11	9	5
	Ventral in.	6-10	8	7
Tibia—	Ventral ou.	4-6	4	14
	Ventral in.	3-4	3	14
Femur—	Dorsal ou.	0	0	16
	Dorsal mi.	0	0	16
	Dorsal in.	0-2	0	14
3—Meta.—	Ventral ou.	3	3	18
	Ventral in.	1	1	18
	Prolateral	1-2	1	12
	Retrolateral	0-2	0	15
Tibia—	Ventral ou.	2-3	3	13
Femur—	Dorsal ou.	0	0	18
	Dorsal mi.	0	0	18
	Dorsal in.	0-2	0	16
4—Meta.—	Ventral ou.	1	1	18
	Ventral in.	3-4	4	16

TABLE 9. SPINATION OF *ARIADNA FIDICINA*

		Female N = 14-20			
		Range	Mode	n	
Palp	Patella	0	0	20	
	Tibia	3-5	5	11	
	Tarsus	7-13	11	5	
Leg:					
1—Meta.—	Ventral ou.	4-6	5	16	
	Ventral in.	5-7	5	10	
Tibia—	Ventral su.	2	2	18	
	Ventral ou.	4	4	18	
	Ventral in.	3-4	4	17	
Femur—	Prolateral	1	1	18	
2—Meta.—	Ventral ou.	3-5	4, 5	8 ea.	
	Ventral in.	4-6	4	10	
Tibia—	Ventral su.	2	2	17	
	Ventral ou.	4	4	17	
Femur—	Ventral in.	0-1	0	12	
	Dorsal ou.	0	0	17	
	Dorsal mi.	0	0	17	
Dorsal in.		0-1	0	16	
	3—Meta.—	Ventral ou.	3	3	19
	Ventral in.	1-2	1	16	
Tibia—	Ventral su.	1-2	1	18	
	Prolateral	1-2	1	18	
Tibia—	Ventral ou.	1-3	3	14	
Femur—	Dorsal ou.	0	0	19	
	Dorsal mi.	0	0	19	
	Dorsal in.	0-1	0	18	
4—Meta.—	Ventral ou.	1-2	1	12	
	Ventral in.	4-6	5	15	
Tibia—	Ventral ou.	0-2	0	17	
	Ventral in.	0-2	0	10	

TABLE 10. SPINATION OF *ARIADNA GRACILIS*

		Male N = 2			Female N = 23-26		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	2	0-2	0	19
	Tibia	1	1	2	6-10	7	9
	Tarsus	0	0	2	7-12	9	8
Leg:							
1—Meta.—	Ventral ou.	1	1	2	7-10	8	11
	Ventral in.	2	2	2	7-10	9	11
	Prolateral	0-1	0, 1	1 ea.	0	0	23
Tibia—	Ventral ou.	6	6	2	6-7	6	21
	Ventral in.	2	2	2	6-7	6	19
	Prolateral	3	3	2	2-3	3	19
	Retrolateral	4	4	2	2-3	2	22
Femur—	Dorsal ou.	1	1	2	1	1	23
	Dorsal mi.	4	4	2	1-2	2	13
	Dorsal in.	2	2	2	1-2	2	22
	Prolateral	0	0	2	2-3	2	17
2—Meta.—	Ventral ou.	3	3	2	7-9	8	16
	Ventral in.	3	3	2	7-11	8, 9	10 ea.
	Retrolateral	1	1	2	0	0	24
Tibia—	Ventral ou.	4	4	2	5-8	6	11
	Ventral in.	2	2	2	5-7	5	16
	Prolateral	3	3	2	2-3	3	19
	Retrolateral	4	4	2	2	2	24
Femur—	Dorsal ou.	1	1	2	1	1	24
	Dorsal mi.	3-4	3, 4	1 ea.	1-2	1	13
	Dorsal in.	2	2	2	1-2	2	23
3—Meta.—	Ventral ou.	3	3	2	3-4	3	24
	Ventral in.	1	1	2	1	1	26
	Prolateral	3	3	2	2-3	3	25
Tibia—	Ventral ou.	2-3	2, 3	1 ea.	1-2	2	22
	Prolateral	2	2	2	0-1	0	19
	Retrolateral	1-2	1, 2	1 ea.	0-1	0	25
Femur—	Dorsal ou.	1-2	1, 2	1 ea.	1-2	1	22
	Dorsal mi.	3-4	3, 4	1 ea.	0-1	0	23
	Dorsal in.	2	2	2	1-2	1	23
4—Meta.—	Ventral ou.	0	0	2	0	0	26
	Ventral in.	4	4	2	3-4	4	21
Femur—	Dorsal ou.	0	0	2	0	0	26
	Dorsal mi.	8	8	2	0	0	26
	Dorsal in.	1	1	2	0	0	26

TABLE 11. SPINATION OF *ARIADNA ISTHMICA*

		Male N = 5-6			Female N = 11-14		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	0	0-1	1	13
	Tibia	0	0	0	4-7	6, 7	5 ea.
	Tarsus	0	0	0	7-11	8	6
Leg:							
1—Meta.—	Ventral ou.	2	2	5	6-8	7	8
	Ventral in.	2-3	3	4	6-8	7	10
	Prolateral	0-1	0	3	0	0	12
	Tibia—Ventral ou.	4	4	5	4-5	4	11
	Ventral in.	1-2	1	3	3-4	4	11
	Ventral su.	0-1	1	3	0	0	12
	Prolateral	3-4	3	4	3	3	12
	Retrolateral	3-7	3, 5	2 ea.	3	3	12
	Dorsal	0-1	0	3	0	0	12
	Femur—Dorsal ou.	1	1	5	1	1	12
	Dorsal mi.	1-2	2	3	1	1	12
	Dorsal in.	2	2	5	1	1	12
Prolateral	0	0	5	1	1	12	
2—Meta.—	Ventral ou.	3	3	5	6-8	7	9
	Ventral in.	3	3	5	6-9	7, 8	5 ea.
	Prolateral	0-1	0	3	0	0	12
	Retrolateral	0-1	1	3	0	0	12
	Tibia—Ventral ou.	4-5	4	4	4-5	4	9
	Ventral in.	1-2	2	3	4-5	4	11
	Ventral su.	1	1	5	0	0	12
	Prolateral	3	3	5	2-3	3	11
	Retrolateral	3-4	4	4	2-3	3	8
	Dorsal	0-1	0	4	0	0	12
	Femur—Dorsal ou.	1	1	5	1	1	12
	Dorsal mi.	1-3	3	3	0-1	1	11
Dorsal in.	1-2	2	3	1-2	1	7	
3—Meta.—	Ventral ou.	3	3	5	3	3	11
	Ventral in.	2	2	5	1-2	2	9
	Prolateral	2-3	3	4	2-3	3	10
	Retrolateral	0-2	0	3	0	0	11
	Tibia—Ventral ou.	3	3	5	2-4	3	9
	Ventral in.	0-1	0	4	0	0	11
	Prolateral	1-2	2	4	0-2	2	8
	Retrolateral	2-3	3	4	0-1	0	9
	Femur—Dorsal ou.	0-2	1	3	0-1	1	10
	Dorsal mi.	2-4	3	3	0	0	13
	Dorsal in.	1-2	1	3	0-2	1	10
	4—Meta.—	Ventral ou.	0-1	1	4	1	1
Ventral in.		4	4	5	3-4	4	13
Femur—Dorsal ou.		0	0	5	0	0	14
Dorsal mi.	1-3	1	3	0	0	14	
Dorsal in.	0	0	5	0	0	14	

TABLE 12. SPINATION OF *ARIADNA MAXIMA*

		Male N = 27-30			Female N = 200				
		Range	Mode	n	Range	Mode	n		
Palp	Patella	0	0	30	0-3	1	173		
	Tibia	0	0	30	1-6	4	138		
	Tarsus	0	0	30	4-9	6	111		
Leg:									
1—Meta.—	Ventral ou.	2-4	3	15	6-16	10	53		
	Ventral in.	2-8	5	12	8-16	11	55		
	Prolateral	0-2	1	13	0	0	200		
	Retrolateral	0-9	3	11	0	0	200		
	Dorsal	0-5	0	22	0	0	200		
	Tibia—	Ventral ou.	3-5	4	23	3-6	4	184	
		Ventral in.	3-4	4	26	3-5	4	185	
		Ventral su.	0-3	1	19	0	0	200	
		Prolateral	3-7	4, 5	8 ea.	0-3	3	95	
		Retrolateral	9-16	11	8	0-4	3	100	
	Dorsal		0-5	0	20	0	0	200	
		Femur—	Dorsal ou.	1-3	1	18	0-2	1	182
			Dorsal mi.	0-4	1	16	0-2	1	170
			Dorsal in.	1-3	2	21	1-3	2	179
			Prolateral	0-1	1	19	0-1	1	197
2—Meta.—	Ventral ou.	3-5	3	18	6-15	9	49		
	Ventral in.	3-7	5	10	7-15	11	48		
	Prolateral	0-2	1	23	0	0	200		
	Retrolateral	1-10	5	7	0	0	200		
	Dorsal	0-2	0	21	0	0	200		
	Tibia—	Ventral ou.	4-6	4	23	4-7	4	189	
		Ventral in.	4	4	27	3-4	4	195	
		Prolateral	2-6	3	12	0-3	2	85	
		Retrolateral	8-14	11	7	0-3	1	90	
		Dorsal	0-3	0	22	0	0	200	
	Femur—	Dorsal ou.	1-3	2	17	0-2	1	175	
		Dorsal mi.	1-7	3, 4	8 ea.	0-2	1	158	
		Dorsal in.	1-2	2	25	1-3	1	186	
		3—Meta.—	Ventral ou.	3-4	3	24	2-4	3	194
	Ventral in.		1-2	2	25	1-2	2	148	
Prolateral	3-4		3	26	1-4	3	184		
Retrolateral	1-4		3	12	0	0	200		
Tibia—	Ventral ou.		3-6	3	20	1-4	2	189	
	Ventral in.		1-3	1	24	0	0	200	
	Prolateral		2-4	2	23	0-3	2	149	
	Retrolateral		3-10	5	8	0-2	0	134	
	Femur—		Dorsal ou.	1-3	2	13	0-1	0	189
Dorsal mi.			3-6	5	13	0-1	0	197	
Dorsal in.			1-2	2	26	0-2	1	120	
4—Meta.—			Ventral ou.	1-3	2	23	0-3	1	174
	Ventral in.		3-4	4	28	4-5	4	199	
	Ventral su.		0-1	0	25	0	0	200	
	Prolateral		1-6	5	10	0	0	200	
	Retrolateral	1-3	2	24	0	0	200		
	Dorsal	0-2	0	26	0	0	200		
	Tibia—	Ventral ou.	0-3	1	17	0	0	200	
		Ventral in.	0-2	1	26	0	0	200	
		Prolateral	0-1	0	26	0	0	200	
		Retrolateral	1-3	1	14	0	0	200	
		Femur—	Dorsal ou.	0-1	0	28	0	0	200
	Dorsal mi.		0	0	30	0-2	0	187	
	Dorsal in.		0-2	1	19	0	0	200	

TABLE 13. SPINATION OF *ARIADNA MOLLIS*

		Male N = 2			Female N = 16-18		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	2	0-1	1	13
	Tibia	0	0	2	3-6	5	12
	Tarsus	0	0	2	6-9	6	6
Leg:							
1—Meta.—	Ventral ou.	2	2	2	7-11	8	5
	Ventral in.	2-3	2, 3	1 ea.	8-11	8	7
Tibia—	Ventral ou.	4-5	4, 5	1 ea.	3-4	4	15
	Ventral in.	0-2	0, 2	1 ea.	2-4	4	15
	Ventral su.	1	1	2	0-1	0	13
	Prolateral	2-4	2, 4	1 ea.	2-3	2	11
	Retrolateral	4	4	2	0-2	0	7
	Dorsal	3	3	2	0	0	17
Pat'l—	Prolateral	1	1	2	0	0	17
Femur—	Dorsal ou.	1	1	2	0-1	1	16
	Dorsal mi.	1	1	2	1	1	17
	Dorsal in.	1-2	1, 2	1 ea.	2	2	17
	Prolateral	0	0	2	1	1	17
2—Meta.—	Ventral ou.	3	3	2	7-11	8	5
	Ventral in.	3	3	2	8-11	9	7
	Retrolateral	1-2	1, 2	1 ea.	0	0	17
Tibia—	Ventral ou.	4-5	4, 5	1 ea.	4	4	18
	Ventral in.	3	3	2	2-3	3	17
	Ventral su.	1	1	2	0	0	18
	Prolateral	3-4	3, 4	1 ea.	1-3	3	12
	Retrolateral	4-5	4, 5	1 ea.	0	0	18
	Dorsal	1	1	2	0	0	18
Pat'l—	Prolateral	0-1	0, 1	1 ea.	0	0	18
Femur—	Dorsal ou.	1	1	2	0-1	1	12
	Dorsal mi.	3	3	2	1-2	1	17
	Dorsal in.	1	1	2	1-2	2	15
3—Meta.—	Ventral ou.	3	3	2	3	3	17
	Ventral in.	1	1	2	1-2	2	9
	Prolateral	2	2	2	2-4	3	12
	Retrolateral	2	2	2	0	0	17
Tibia—	Ventral ou.	3	3	2	1-3	3	10
	Prolateral	1	1	2	0-3	2	10
	Retrolateral	0	0	2	0-1	0	16
Femur—	Dorsal ou.	0	0	2	0-1	0	15
	Dorsal mi.	4-5	4, 5	1 ea.	0-2	1	8
	Dorsal in.	1	1	2	0-1	1	16
4—Meta.—	Ventral ou.	1	1	2	1	1	17
	Ventral in.	7	7	2	5-8	6	13
Femur—	Dorsal ou.	0	0	2	0	0	17
	Dorsal mi.	5	5	2	0-2	0	8
	Dorsal in.	0-1	0, 1	1 ea.	0	0	17

TABLE 14. SPINATION OF *ARIADNA MULTISPINOSA*

		Female N = 2	
		Range	n
Palp	Patella	0	2
	Tibia	3	2
	Tarsus	4	2
Leg:			
1—Meta.—	Ventral ou.	9–10	1 ea.
	Ventral in.	10	2
Tibia—	Ventral ou.	11	2
	Ventral in.	8–10	1 ea.
Femur—	Dorsal ou.	1	2
	Dorsal mi.	0–1	1 ea.
	Dorsal in.	0	2
	Prolateral	2–3	1 ea.
2—Meta.—	Ventral ou.	7–8	1 ea.
	Ventral in.	8–10	1 ea.
Tibia—	Ventral ou.	10–11	1 ea.
	Ventral in.	8	2
Femur—	Dorsal ou.	0–1	1 ea.
	Dorsal mi.	1	2
	Dorsal in.	0–1	2
3—Meta.—	Ventral ou.	3	2
	Ventral in.	2	2
	Prolateral	1	2
Tibia—	Ventral ou.	3	2
	Ventral in.	4	2

TABLE 15. SPINATION OF *ARIADNA MURPHYI*

		Female N = 12–14		
		Range	Mode	n
Palp	Patella	0	0	14
	Tibia	0–3	2	6
	Tarsus	3–8	4	4
Leg:				
1—Meta.—	Ventral ou.	4–9	7	6
	Ventral in.	6–9	8	6
Tibia—	Ventral ou.	4	4	12
	Ventral in.	4	4	12
	Prolateral	1–5	3	5
	Retrolateral	0–5	4	5
Femur—	Dorsal ou.	0–1	1	10
	Dorsal mi.	0–3	1	6
	Dorsal in.	0–2	0	6
Prolateral		1	1	12
	2—Meta.—	Ventral ou.	4–9	6, 8
Ventral in.		6–10	7	5
	Tibia—	Ventral ou.	4	4
Ventral in.		3–4	4	10
Prolateral		1–4	2	5
	Retrolateral	0–3	0	11
Femur—	Dorsal ou.	0–1	1	10
	Dorsal mi.	1–4	3	9
	Dorsal in.	1	1	14
3—Meta.—	Ventral ou.	3	3	17
	Ventral in.	1–2	1	8
	Prolateral	2–3	2	13
Tibia—	Ventral ou.	2–4	3	8
	Prolateral	0–2	0	8
	Retrolateral	0–1	0	13
Femur—	Dorsal ou.	0	0	14
	Dorsal mi.	0–3	0	7
	Dorsal in.	1–2	1	12
4—Meta.—	Ventral ou.	1–2	1	9
	Ventral in.	2–3	2	13
Femur—	Dorsal mi.	1–3	2	7

TABLE 16. SPINATION OF *ARIADNA OBSCURA*

		Female N = 2		
		Range	n	
Palp	Patella	1	2	
	Tibia	5	2	
	Tarsus	8-9	1 ea.	
Leg:				
1—Meta.—	Ventral ou.	6-7	1 ea.	
	Ventral in.	5-6	1 ea.	
	Prolateral	2	2	
	Retrolateral	2	2	
	Tibia—	Ventral ou.	4	2
		Ventral in.	4	2
		Prolateral	4	2
		Retrolateral	4	2
	Pat'l—	Prolateral	2	2
		Retrolateral	1	2
	Femur—	Dorsal ou.	1	2
		Dorsal mi.	1	2
		Dorsal in.	2	2
		Prolateral	1	2
	2—Meta.—	Ventral ou.	5-6	1 ea.
		Ventral in.	6-7	1 ea.
Prolateral		2	2	
Retrolateral		2	2	
Tibia—		Ventral ou.	4	2
		Ventral in.	1	2
		Prolateral	3	2
		Retrolateral	4	2
Pat'l—		Prolateral	2	2
Femur—		Dorsal ou.	1	2
		Dorsal mi.	1	2
		Dorsal in.	2	2
3—Meta.—		Ventral ou.	3	2
		Ventral in.	1	2
		Prolateral	3	2
		Retrolateral	2	2
	Tibia—	Ventral ou.	3	2
		Prolateral	1	2
		Retrolateral	2-3	1 ea.
	Femur—	Dorsal ou.	0-1	1 ea.
		Dorsal mi.	0	2
		Dorsal in.	1	2
	4—Meta.—	Ventral ou.	1	2
		Ventral in.	2	2

TABLE 17. SPINATION OF *ARIADNA PILIFERA*

		Male N = 20-22			Female N = 71-80			
		Range	Mode	n	Range	Mode	n	
Palp	Patella	0	0	22	0-1	0	72	
	Tibia	0	0	22	2-6	4	41	
	Tarsus	0	0	22	5-14	9	25	
Leg:								
1—Meta.—	Ventral ou.	1-2	2	16	6-10	8	35	
	Ventral in.	3-5	5	10	6-10	8	36	
	Prolateral	0-1	1	13	0	0	71	
	Tibia—	Ventral ou.	4-6	5	12	3-7	4	41
		Ventral in.	0-2	1	8	3-7	4	46
		Ventral su.	0-1	1	18	0	0	72
		Prolateral	3-5	4	16	0-4	2	21
		Retrolateral	3-5	4	17	0-4	1	34
	Femur—	Dorsal ou.	1-2	1	15	0-2	1	63
		Dorsal mi.	1-4	1, 2	8 ea.	0-3	1	52
		Dorsal in.	2	2	20	0-2	2	66
		Prolateral	0-1	1?	10	1	1	72
2—Meta.—	Ventral ou.	3-4	3	19	7-11	8	34	
	Ventral in.	3-4	3	20	7-11	9	27	
	Prolateral	0-1	0	15	0	0	71	
	Retrolateral	0-2	1	12	0	0	71	
	Tibia—	Ventral ou.	4-7	5	10	4-7	4	48
		Ventral in.	0-2	2	12	1-3	2	40
		Ventral su.	0-1	1	20	0	0	72
		Prolateral	2-5	4	10	0-5	3	38
		Retrolateral	3-4	4	17	0-1	0	69
	Femur—	Dorsal ou.	1-2	1	12	0-3	1	29
		Dorsal mi.	1-4	1	8	0-3	1	55
		Dorsal in.	1-3	2	17	1-3	2	63
3—Meta.—	Ventral ou.	3	3	21	3-4	3	75	
	Ventral in.	0-2	2	18	1-2	2	71	
	Prolateral	2-4	3	16	1-5	3	58	
	Tibia—	Ventral ou.	3-5	3	13	1-5	3	44
		Prolateral	2-4	3	12	0-4	2	34
	Femur—	Dorsal ou.	0-1	0	19	0-1	0	69
		Dorsal mi.	0-4	3	8	0-2	0	32
		Dorsal in.	1-3	2	17	1-3	2	66
	4—Meta.—	Ventral ou.	0-2	2	18	1-3	2	63
Ventral in.		2-4	4	12	3-5	3	49	
Tibia—		Ventral ou.	0-1	1	18	0-1	1	52
		Retrolateral	0	0	22	0-3	0	58
Femur—		Dorsal ou.	0	0	22	0	0	77
		Dorsal mi.	2-6	4	7	0-2	0	39
		Dorsal in.	0-3	1	10	0-2	0	55
		Retrolateral	0	0	22	0-4	0	32

TABLE 18. SPINATION OF *ARIADNA PRAGMATICA*

		Female N = 4-6		
		Range	Mode	n
Palp	Patella	0	0	6
	Tibia	2-4	3	3
	Tarsus	7-9	9	3
Leg:				
1—Meta.—	Ventral ou.	7-8	7, 8	3 ea.
	Ventral in.	7-10	7, 8	2 ea.
Tibia—	Ventral ou.	4	4	6
	Ventral in.	4-5	4	4
Femur—	Dorsal ou.	0	0	6
	Dorsal mi.	0-1	0	4
	Dorsal in.	0-1	0, 1	3 ea.
	Prolateral	1	1	6
2—Meta.—	Ventral ou.	7-9	7, 8, 9	2 ea.
	Ventral in.	8-10	8	3
Tibia—	Ventral ou.	4	4	6
	Ventral in.	1-2	1, 2	3 ea.
	Prolateral	0-1	0, 1	3 ea.
Femur—	Dorsal in.	1	1	6
3—Meta.—	Ventral ou.	2-3	3	5
	Ventral in.	1-2	1	5
	Prolateral	1-2	2	5
Tibia—	Ventral ou.	1-4	3	3
	Prolateral	0-1	0	4
Femur—	Dorsal in.	1	1	6
4—Meta.—	Ventral ou.	1-3	1	4
	Ventral in.	2	2	6
Femur—	Dorsal ou.	0	0	6
	Dorsal mi.	0-1	0	4
	Dorsal in.	0	0	6

TABLE 19. SPINATION OF *ARIADNA SOLITARIA*

		Juvenile N = 1-2	
		Range	n
Palp	Patella	1	2
	Tibia	3-5	1 ea.
	Tarsus	6	2
Leg:			
1—Meta.—	Ventral ou.	7	1
	Ventral in.	7	1
Tibia—	Ventral ou.	4	1
	Ventral in.	4	1
	Ventral su.	1	1
	Prolateral	3	1
Femur—	Retrolateral	3	1
	Dorsal ou.	1	1
	Dorsal mi.	1	1
	Dorsal in.	2	1
Prolateral		1	1
2—Meta.—	Ventral ou.	6	2
	Ventral in.	7	2
Tibia—	Ventral ou.	4	2
	Ventral in.	4	2
	Prolateral	2-3	1 ea.
Retrolateral		1	2
Femur—	Dorsal ou.	1	2
	Dorsal mi.	1	2
	Dorsal in.	1-2	1 ea.
3—Meta.—	Ventral ou.	3	2
	Ventral in.	1	2
	Prolateral	2	2
Tibia—	Ventral ou.	2	2
Femur—	Dorsal ou.	0-1	1 ea.
	Dorsal mi.	0	2
	Dorsal in.	2	2
4—Meta.—	Ventral ou.	2	2
	Ventral in.	4	2

TABLE 20. SPINATION OF *ARIADNA TARSALIS*

		Juvenile N = 6		
		Range	Mode	n
Palp	Patella	0	0	6
	Tibia	3-6	3	4
	Tarsus	6-9	6	3
Leg:				
1—Meta.—	Ventral ou.	8-9	9	4
	Ventral in.	8-9	8	5
Tibia—	Ventral ou.	5-9	5, 9	2 ea.
	Ventral in.	4-7	7	2
	Prolateral	0-3	2	3
	Retrolateral	0-3	3	4
Femur—	Dorsal ou.	0-1	1	4
	Dorsal mi.	0-2	1	4
	Dorsal in.	0-2	1	4
	Prolateral	1	1	6
2—Meta.—	Ventral ou.	8-9	8	5
	Ventral in.	7-10	9	3
Tibia—	Ventral ou.	6-11	7	2
	Ventral in.	4-6	4	3
	Prolateral	0-2	0	3
Femur—	Dorsal ou.	0-1	0, 1	3 ea.
	Dorsal mi.	1-2	1, 2	3 ea.
	Dorsal in.	1-2	1, 2	3 ea.
3—Meta.—	Ventral ou.	3	3	6
	Ventral in.	1-2	1	4
	Prolateral	2-3	3	4
Tibia—	Ventral ou.	3	3	6
	Prolateral	0-1	0	5
Femur—	Dorsal ou.	0	0	6
	Dorsal mi.	0-2	0	4
	Dorsal in.	1-2	1	4
4—Meta.—	Ventral ou.	1	1	6
	Ventral in.	2-3	2	5

TABLE 21. SPINATION OF *ARIADNA TOVARENSIS*

		Female N = 4		
		Range	Mode	n
Palp	Patella	1	1	4
	Tibia	5-6	5, 6	2 ea.
	Tarsus	7-10	10	2
Leg:				
1—Meta.—	Ventral ou.	5-7	5	2
	Ventral in.	5-7	7	2
Tibia—	Ventral ou.	4	4	4
	Ventral in.	4	4	4
	Prolateral	3-4	3	3
	Retrolateral	4	4	4
Femur—	Dorsal ou.	1	1	4
	Dorsal mi.	1	1	4
	Dorsal in.	1-2	2	3
Prolateral	1	1	4	
2—Meta.—	Ventral ou.	5-7	5	2
	Ventral in.	3-5	5	3
Tibia—	Ventral ou.	4	4	4
	Ventral in.	3	4	4
	Prolateral	2-3	3	3
	Retrolateral	2-3	2	3
Femur—	Dorsal ou.	1	1	4
	Dorsal mi.	0-1	1	3
	Dorsal in.	1-2	1, 2	2 ea.
3—Meta.—	Ventral ou.	3-3	3	4
	Ventral in.	1	1	4
	Prolateral	1	1	4
Tibia—	Ventral ou.	1-3	3	2
	Prolateral	0-1	0, 1	2 ea.
Femur—	Dorsal in.	0-1	0, 1	2 ea.
4—Meta.—	Ventral ou.	0	0	4
	Ventral in.	4	4	4

TABLE 22. SPINATION OF *ARIADNA TUBICOLA*

		Juvenile N = 4		
		Range	Mode	n
Palp	Patella	1	1	4
	Tibia	5-7	7	2
	Tarsus	8-9	9	3
Leg:				
1—Meta.—	Ventral ou.	5-6	5	3
	Ventral in.	6	6	4
Tibia—	Ventral ou.	5-6	5, 6	2 ea.
	Ventral in.	5-7	6	2
	Prolateral	1-2	2	3
	Retrolateral	0-1	1	3
Femur—	Dorsal ou.	0	0	4
	Dorsal mi.	0-1	1	3
	Dorsal in.	0	0	4
	Prolateral	1	1	4
2—Meta.—	Ventral ou.	3-5	4	2
	Ventral in.	5-6	6	3
Tibia—	Ventral ou.	5-7	7	3
	Ventral in.	4-6	4	2
	Prolateral	2	2	4
Femur—	Dorsal ou.	0	0	4
	Dorsal mi.	0-1	1	3
	Dorsal in.	0	0	4
3—Meta.—	Ventral ou.	3	3	4
	Ventral in.	0	0	4
	Prolateral	0-1	1	3
Tibia—	Ventral ou.	1-2	1, 2	2 ea.
	Prolateral	0-1	0, 1	2 ea.
Femur—	Dorsal mi.	0-1	0	3
4—Meta.—	Ventral ou.	0	0	4
	Ventral in.	4-5	5	3

TABLE 23. SPINATION OF *ARIADNA WEAVERI*

		Male N = 3-4			Female N = 13-14		
		Range	Mode	n	Range	Mode	n
Palp	Patella	0	0	14	0	0	14
	Tibia	0	0	4	3-9	3	9
	Tarsus	0	0	4	6-15	12	4
Leg:							
1—Meta.—	Ventral ou.	0	0	3	7-10	8, 9	5 ea.
	Ventral in.	0	0	3	7-9	8	7
Tibia—	Ventral ou.	4-5	5	2	4-5	4	11
	Ventral in.	2	2	3	3-5	4	10
	Ventral su.	0-1	0	2	0	0	14
	Prolateral	1, 3, 4		1 ea.	0	0	14
	Retrolateral	3-4	3	2	0	0	14
Femur—	Dorsal ou.	0	0	3	0	0	14
	Dorsal mi.	0-1	1	2	0-1	0	12
	Dorsal in.	2	2	3	0-1	0	8
	Prolateral	1	1	3	1	1	14
2—Meta.—	Ventral ou.	0	0	4	7-11	7, 9	5 ea.
	Ventral in.	0	0	4	9-16	10	5
Tibia—	Ventral ou.	4	4	4	4-6	4	6
	Ventral in.	1-2	1	3	1-4	2	9
	Prolateral	1-4	1	2	0-1	0	12
	Retrolateral	0-1	0, 1	2 ea.	0	0	13
Femur—	Dorsal ou.	0	0	4	0	0	13
	Dorsal mi.	0-1	0, 1	2 ea.	0	0	13
	Dorsal in.	1-2	1	3	1-2	1	8
3—Meta.—	Ventral ou.	3	3	4	3-4	3	13
	Ventral in.	1	1	4	1-2	2	11
	Prolateral	0	0	4	0-3	2	8
Tibia—	Ventral ou.	1-2	2	3	1-3	2	12
	Prolateral	0-1	0	3	0-2	1, 2	5 ea.
Femur—	Dorsal ou.	0	0	4	0	0	14
	Dorsal mi.	0	0	4	0	0	14
	Dorsal in.	0-1	0, 1	2 ea.	1-2	1	12
4—Meta.—	Ventral ou.	1-2	1	3	1-2	1	13
	Ventral in.	3	3	4	3	3	14
	Ventral su.	0-1	0, 1	2 ea.	0	0	14
Femur—	Dorsal ou.	0	0	4	0	0	14
	Dorsal mi.	2-3	2	3	0	0	14
	Dorsal in.	0	0	4	0	0	14

TABLE 24. DIAGNOSTIC FEATURES OF HAPLOGYNE SPIDER FAMILIES

	Plectreuridae	Dignetiidae	Sicariidae	Scytodidae
Chelicerae	Joined basally; laminate, chelate.	Joined basally; laminate, chelate.	Joined basally; laminate, chelate.	Joined basally; laminate, chelate.
Cohulus	Minute plate bearing 2 setae.	Tiny, conical, with 2 lateral setae.	Conspicuous, conical, with about 12 setae.	Conspicuous, conical or rounded, with 11–20 setae.
Male palp	Short tarsus, large bulb; embolus slender, simple, or flat, two-parted; no conductor	Short tarsus, large bulb; slender simple embolus; large scoop-like conductor.	Tarsus and bulb small; embolus conical basally, slender and simple distally; no conductor.	Tarsus variable, bulb large or small; embolus conical basally, slender and simple distally; no conductor.
Female genitalia	With bursa copulatrix; no sclerotized seminal receptacles.	With bursa copulatrix; a single median seminal receptacle.	?	No bursa copulatrix; a pair of seminal receptacles, these sometimes united.
Heart ostia	?	?	3 pairs	3 pairs
Anterior respiratory organs	Lungs	Lungs	Lungs	Lungs
Posterior respiratory organs	Median tracheal spiracle behind middle of abdomen; tracheae probably rudimentary.	Median tracheal spiracle behind middle of abdomen; tracheae simple, restricted to abdomen.	Median tracheal spiracle behind middle of abdomen; tracheae lost.	Median tracheal spiracle behind middle of abdomen; tracheae simple, restricted to abdomen.

TABLE 25. DIAGNOSTIC FEATURES OF HAPLOGYNE SPIDER FAMILIES (Continued)

	Dysderinae	Segestriinae	Oonopidae	Caponiidae
Chelicerae	Free, subchelate, not laminate.	Free, subchelate, not laminate.	Free, subchelate, not laminate.	Free, subchelate, not laminate.
Colulus	Absent, or a tiny plate with 2-4 setae.	Large, rounded, with several setae.	Absent, or a tiny plate with 2 setae.	Absent.
Male palp	Variable, similar to segestriines or partly subdivided apically into several projections	Tarsus short or long, bulb large; embolus conical basally, slender and simple distally; no conductor.	Tarsus small; bulb large and globular with variable embolus, or no separate bulb; no conductor.	Tarsus short, bulb globular, embolus short to very long, curved, bifurcate at tip; no conductor.
Female genitalia	With copulatory bursa; T-shaped median seminal receptacle.	With copulatory bursa; tiny median seminal receptacle.	?	?
Heart ostia	2 pairs	2 pairs	2 pairs	2 pairs
Anterior respiratory organs	Lungs	Lungs	Greatly reduced lungs, or tracheae only.	Tracheae.
Posterior respiratory organs	Pair of tracheal spiracles just behind epigastric groove; tracheae well-developed, entering cephalothorax.	Pair of tracheal spiracles just behind epigastric groove; tracheae well-developed, entering cephalothorax.	Pair of tracheal spiracles just behind epigastric groove; tracheae well-developed, entering cephalothorax.	Pair of tracheal spiracles just behind epigastric groove; tracheae well-developed, entering cephalothorax.

Plate I. Fig. 1. *Ariadna mollis* (Holmberg). Dorsal view of female from Cavinna, Parana, Brazil. Fig. 2. *Ariadna maxima* (Nicolet). Sternum, endites, labium, and labrum of female from Mas Afuera Island, Juan Fernandez Islands, Chile. Fig. 3. *Ariadna boesenbergii* Keyserling. Ventral view of tibia II of female lectoparatype from Montevideo, Uruguay. Figs. 4, 6. *Ariadna boliviana* Simon. 4. Lateral view of carapace of male lectotype from Espiritu Santo, Bolivia. 6. Lateral view of carapace of female lectoparatype from Espiritu Santo, Bolivia. Fig. 5. Dorsal view of eye region of female *Ariadna* sp., showing lines along which measurements were made. Fig. 7. *Ariadna gracilis* Vellard. Mesal view of femur I of female from St. André, Marajão, Brazil.

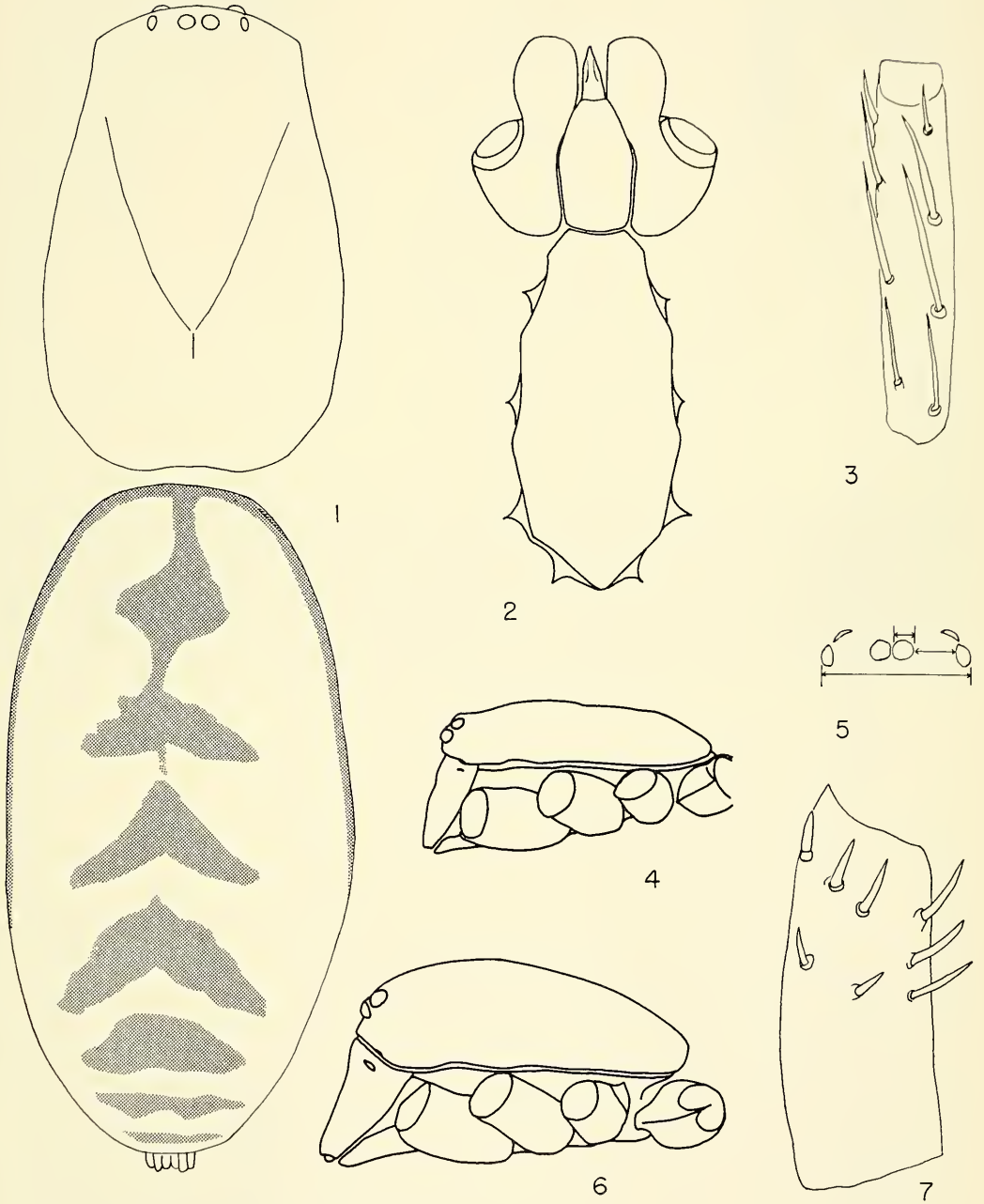
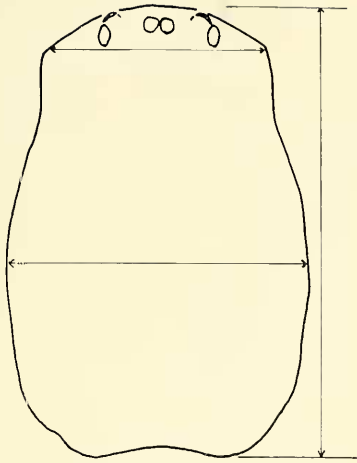
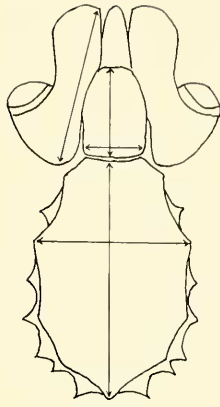


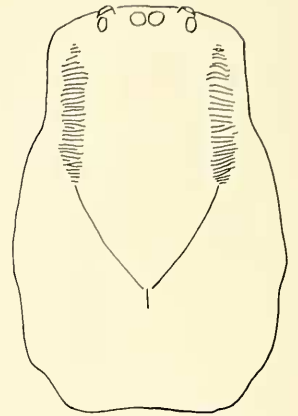
Plate II. Figs. 8-9. *Ariadna arthuri* Petrunkevitch. Female from South Bimini, Bahama Islands, showing lines along which measurements were made. 8. Dorsal view of carapace. 9. Ventral surface of cephalothorax. Fig. 10. *Ariadna fidicina* (Chamberlin). Dorsal view of carapace of female from Laguna Beach, California, showing stridulating grooves. Fig. 11. *Ariadna cephalotes* Simon. Ventral view of abdomen of female lectotype from San Mateo, Bolivia. Fig. 12. Left palp of male *Ariadna*, showing regions of palpal organ. A, bulb; B, midpiece; C, embolic portion. Fig. 13. Ventro-lateral view of metatarsus I of female *Ariadna*, showing one of the rows of ventral spines. Fig. 14. *Ariadna boliviana* Simon. Ventral view of genital region of female lectoparatype from Espiritu Santo, Bolivia. Overlying tissue removed to expose seminal receptacle. Fig. 15. Lateral view of leg I of *Ariadna* sp., showing lines along which measurements were made.



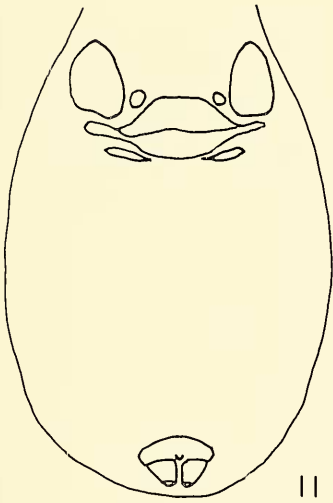
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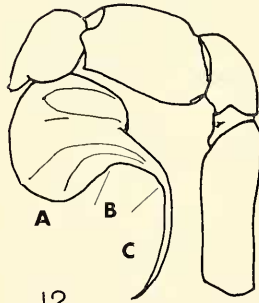
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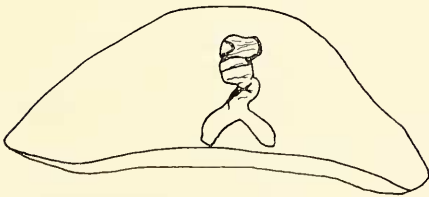
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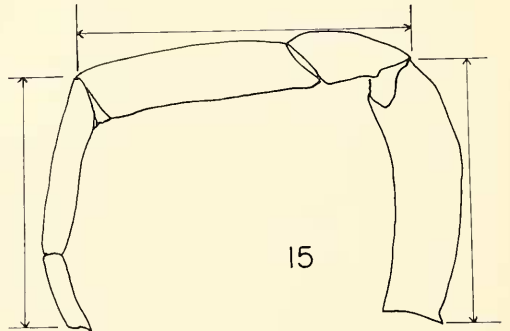
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Plate III. Figs. 16-17, 22. *Ariadna mollis* (Holmberg). Male from Tigre, Buenos Aires, Argentina. 16. Left palp, mesal view. 17. Left palp, lateral view. 22. Tibia and metatarsus I, dorsal view. Figs. 18-19, 21. *Ariadna maxima* (Nicolet). Male from Mas Afuera Island, Juan Fernandez Islands, Chile. 18. Left palp, lateral view. 19. Left palp, mesal view. 21. Tibia and metatarsus I, dorsal view. Fig. 20. *Ariadna pilifera* O. P. Cambridge. Tibia and metatarsus I of male, dorsal view. (Holotype of *Ariadna acanthopus* Simon from Guanajuato, Mexico.) Figs. 23-25. *Ariadna isthmica* sp. n. Male holotype from Barro Colorado Island, Canal Zone, Panama. 23. Tibia and metatarsus I, dorsal view. 24. Left palp, mesal view. 25. Left palp, lateral view.

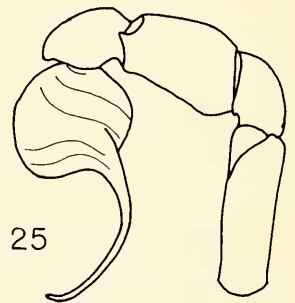
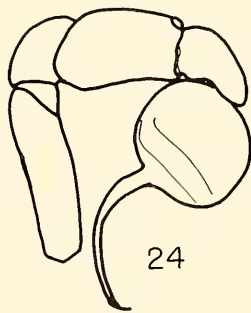
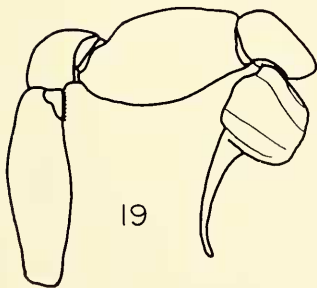
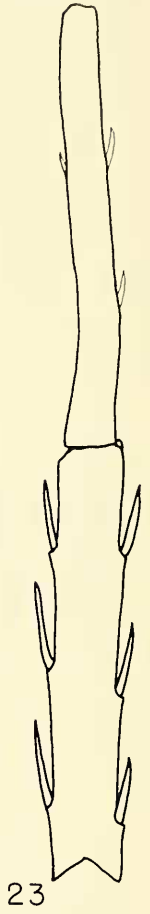
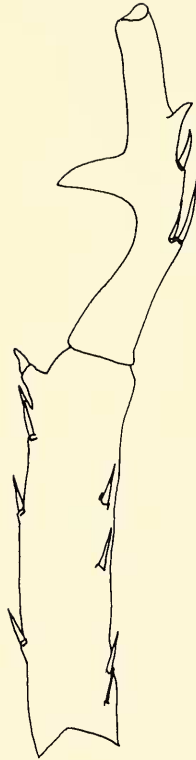
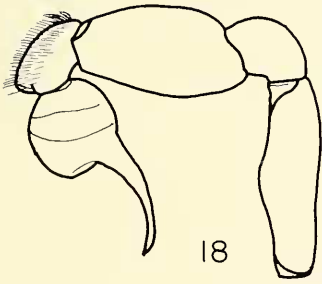
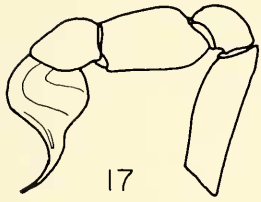
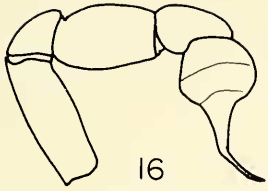
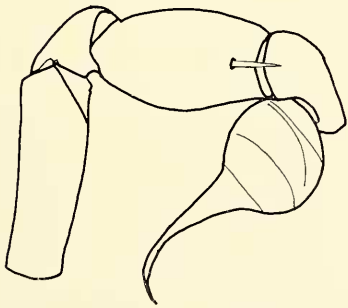
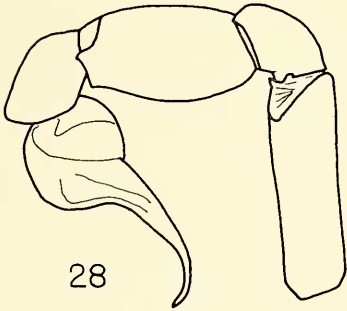
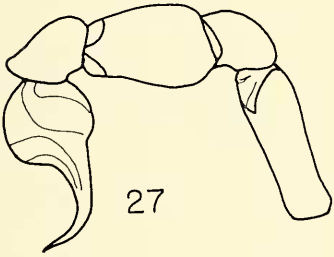
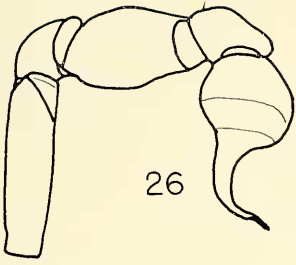
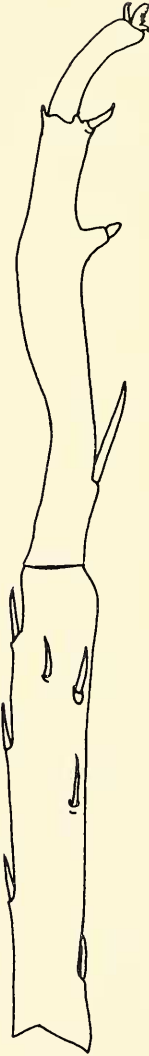


Plate IV. Figs. 26–27, 32. *Ariadna arthuri* Petrunkevitch. Male from South Bimini, Bahama Islands. 26. Left palp, mesal view. 27. Left palp, lateral view. 32. Tibia, metatarsus, and tarsus I, dorsal view. Figs. 28–29, 33. *Ariadna gracilis* Velard. Male from Téfé, Amazonas, Brazil. 28. Left palp, lateral view. 29. Left palp, mesal view. 33. Left tibia and metatarsus I, dorsal view. Fig. 30. *Ariadna isthmica* sp. n. Male from Barro Colorado Island, Canal Zone, Panama. Left metatarsus and tarsus IV showing scopulae. Fig. 31. *Ariadna pilifera* O. P.-Cambridge. Female from Southwestern Research Station, 5 mi W of Portal, Cochise Co., Arizona. Ventral view of metatarsus IV showing comb and outer row of ventral spines.

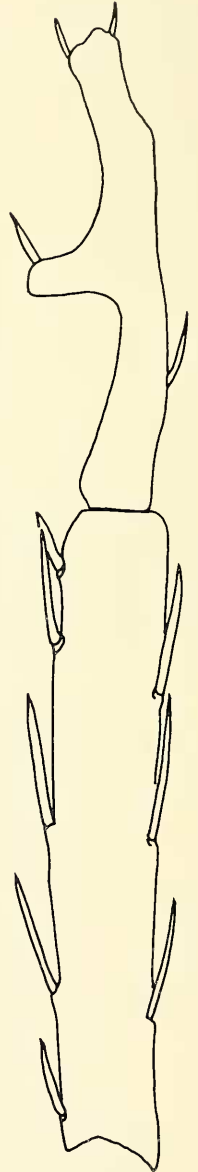


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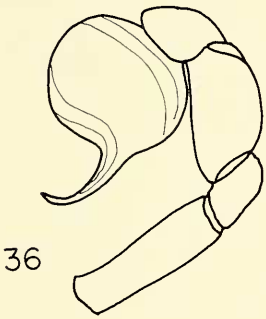
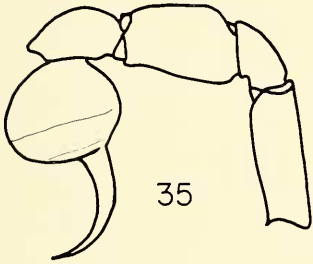
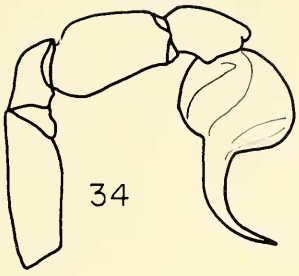


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Plate V. Figs. 34–35, 39. *Ariadna peruviana* sp. n. Male from Lima, Lima, Peru. 34. Left palp, mesal view. 35. Left palp, lateral view. 39. Left tibia and metatarsus I, dorsal view. Figs. 36–37, 40–41. *Ariadna pilifera* O. P. Cambridge. Male from Southwestern Research Station, 5 mi W of Portal, Cochise Co., Arizona. 36. Left palp, lateral view. 37. Left palp, mesal view. 40. Left tibia I, lateral view. 41. Left tibia, metatarsus, and tarsus I, dorsal view. Figs. 38, 42–43. *Ariadna bicolor* (Hentz). Male from Mohican State Park, Ashland Co., Ohio. 38. Left tibia and metatarsus I, dorsal view. 42. Left palp, mesal view. 43. Left palp, lateral view.



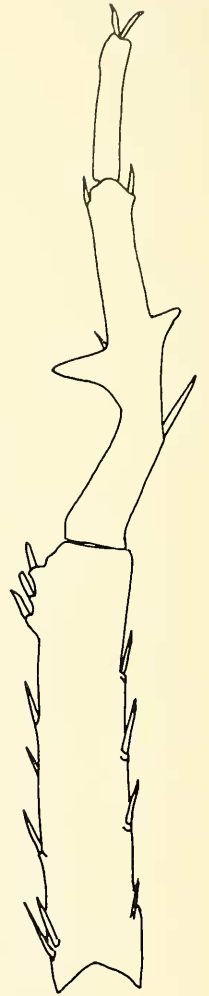
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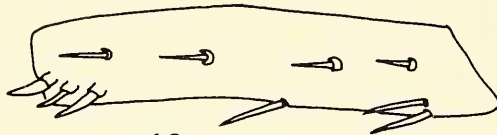
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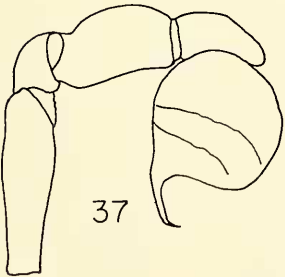
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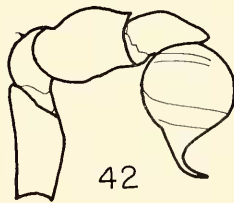
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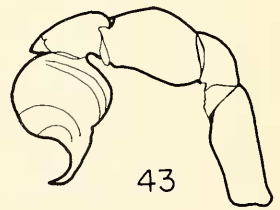
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Plate VI. Figs. 44–45, 49. *Ariadna caerulea* Keyserling. Male from Sierra Nevada de Santa Marta, Magdalena, Colombia. 44. Left palp, mesal view. 45. Left palp, lateral view. 49. Left tibia and metatarsus I, dorsal view. Figs. 46–48. *Ariadna baesenbergii* Keyserling. Male lectotype from Montevideo, Uruguay. 46. Left palp, lateral view. 47. Left palp, mesal view. 48. Left tibia and metatarsus I, dorsal view. Figs. 50, 53, 56. *Ariadna weaveri* sp. n. Male from Clarion Island, Revilla Gigedo Islands group, Mexico. 50. Left tibia and metatarsus I, dorsal view. 53. Left palp, mesal view. 56. Left palp, lateral view. Figs. 51–52, 54–55. *Ariadna boliviana* Simon. Male lectotype from Espiritu Santo, Bolivia. 51. Left tibia, metatarsus, and tarsus I, dorsal view. 52. Right metatarsus and tarsus IV, showing comb. 54. Left palp, anterior view. 55. Left palp, mesal view.

